

FEDERATED MALAY STATES.

REPORT ON FOREST ADMINISTRATION FOR THE YEAR 1923.

CHAPTER I.

CONSTITUTION OF FORESTS.

I.—EXPLORATION.

In 1920 the Forest Department promised to expedite the exploration of the areas within which it was thought that forest reserves should lie, and to relinquish claim on such parts of those areas as were not needed for forest purposes. Within three years 3,600,000 acres were examined and reported on, of which 750,000 acres were covered by a half-per-cent. enumeration survey of the growing stock; 2,000,000 acres were relinquished to purposes other than forestry; and 1,600,000 acres were either reserved or proposed for reservation under the Forest Enactment. In July, 1923, a report on the work done, in the form of a supplement to "Wood in the Federated Malay States—its use, misuse, and future provision"*, was issued to all Residents and land officers for information; and at the same time a progress map of each State, revising those published in 1920, was circulated, in order that the maps in land offices might be brought up to date.

2. The results of the work since 1920 are that we now have a rough general knowledge of the forests of Perak except in certain remote parts in the extreme north of the State and along the main mountain range on the east; that the whole of the plains of Selangor except the great swamp between the Selangor and Bernam rivers has been explored, and that proposals in that State are complete except in the higher hills, where preliminary exploration will probably be unnecessary owing to the obvious importance of the forests for protective purposes; that exploration in Negri Sembilan is complete except for two areas in the north of the State; and that only about a quarter of Pahang awaits reconnaissance. In addition we have added considerably to our knowledge of the composition of certain types of forest and of their timber contents; we have secured detailed descriptions and illustrations of a number of trees of economic importance; and we have either already increased, or paved the way to increase, the forest revenue.

3. The exploration work of the year was confined almost entirely to Negri Sembilan and Pahang. Bad weather combined with shortage or illness of officers prevented anything from being done in Perak, and in Selangor the detailed examination of an area outside the Ampang Reserve with a view to its use for a forest school, research institute, and plantations was stopped almost at once owing to objection on account of its proximity to the Kuala Lumpur water supply area.

4. **NEGRI SEMBILAN.**—The State land adjacent to the Bukit Tunggul Reserve in Selangor was examined at the request of the Collector of Land Revenue, Seremban, and was found to contain an unusually large number of *taban*† trees and a fair amount of timber, but to have been very wastefully worked by wood-cutters. The principal work was however in the area between the Jelai-Gemas and Gemas Reserves, extending southwards as far as the Sungai Gemencheli. A one-per-cent. enumeration survey was made over an area of about 18,000 acres, and a forest of very good quality, though somewhat severely damaged by wind, was found, containing an abundance of *meranti*, *keruing*, *resak*, *kempas*, *keledang*, and *mempening*, with a fair amount of rattan.

5. **PAHANG.**—At the request of the Public Works Department the forest on Fraser's Hill was examined to ascertain what supplies of timber and fuel were likely to be available for the use of the residents there. The development of the hill station has led to the destruction of a large amount of valuable timber, and there is likely to be a serious shortage of firewood in a few years; a 12 per cent. valuation disclosed the fact that over a wooded area of about 1,000 acres there is not more than 5 tons of timber and 5 tons of firewood per acre. Large quantities of firewood are of course to be had on the more distant ridges, but its transport to Fraser's Hill will be very costly.

* By G. E. S. Cubitt, Conservator of Forests, F.M.S. and S.S. Issued in 1920 from the Government Printing Office, Kuala Lumpur, and now out of print.

† The botanical names and the uses of the trees mentioned in this report are given in Appendix A.

A rich forest was found in the west of the Temerloh district between the Sungai Lompat on the north, the railway on the east, the Kerdau reserve on the south, and the Sungai Tris on the west, the average timber content, calculated from a half-per-cent. valuation of about 94,000 acres, being not less than 43 tons per acre, chiefly *meranti*, *keruing*, *kempas*, *chengal*, *keladan*, and *seraya*. The area also contains large quantities of rattan, which are being exploited by Sakais. The composition of the forest was studied in some detail; descriptions of about 30 species of trees were prepared for use in the compilation of the proposed manual of the commercial timber trees of the Peninsula; and nearly 200 photographs were taken for the manual, and for research and other purposes.

II.—FOREST RESERVE PROPOSALS AND SETTLEMENTS.

6. A record was made by the constitution of 507,379 acres of reserved forest; 192,371 acres were proposed for reservation; and at the close of the year the area preliminarily notified and in process of settlement or awaiting final notification was 787,026 acres. Reserved forests now occupy about 15.9 per cent. of the whole country, and for the first time exceed in extent the alienated land.

7. PERAK.—In the Lower Perak district there is some danger of a shortage of timber and fuel, and after much discussion it has been agreed not to reserve the area between the Erong Reserve and what was known as the Naested Concession, but to reserve instead about 13,000 acres of forest comprising the concession (now reverted to Government) and a strip of land to the east of it. The preliminary notification was however not gazetted during the year. The only reserve preliminarily notified was an extension of 1,283 acres to the Larut Hills reserve near Padang Rengas in the Kuala Kangsar district to protect the rice-fields below.

The settlement of the Kroh Reserve Extension of 31,000 acres in the Batang-Padang and Lower Perak districts was practically completed, but final notification has to await the demarcation and survey of certain areas which are to be excluded from the reserve for cultivation by Malays and Sakais. The settlement of extensions of 48,000 acres to the Besout Reserve in the Batang Padang district and of 133,305 acres to the Bintang-Hijau Reserve in the Larut and Selama districts was completed, and final notifications were under consideration at the end of the year.

Of the areas which were settled during or before the year under report 140,757 acres were gazetted as reserved forest, as follows:

- (i) The Papulut Reserve of 36,000 acres in the Upper Perak district between the Perak River and the road from Kuala Kineri to Grik, containing valuable timber.
- (ii) An extension of 98,600 to the Bintang-Hijau Reserve in the Upper Perak district, including all the hilly country west of the road from Sumpitan to Kampong Kenayat and thence west of the Tra bridle-path. The main objects of reservation are physical, but on the lower slopes is much good timber.
- (iii) An extension of 6,157 acres to the Kledang-Saiong Reserve in the Kuala Kangsar district, consisting chiefly of blocks of old mining land which had reverted to Government. By this extension the boundaries of the reserve are improved, and about 4,000 acres of valuable *chengal* forest saved.

In all the above reserves the rights of Malays to forest produce for their own use have been provided for.

8. SELANGOR.—In this State the progress of settlement was slow owing to the want of officers to align new boundaries.

A proposal to reserve the forests in the Ulu Selangor hills was discussed. The whole area is tin-bearing, but is unlikely to be alienated for mining for many years. It seems advisable in the meantime to reserve the forest, because, as the law now stands, reservation affords the only effective means of preventing wasteful fuel-cutting by the Chinese miners.

An extension of about 45,800 acres to the Kelambu Reserve in the Kuala Langat district was preliminarily notified as the result of the exploration made in 1922. The forest is not a valuable one, but will, it is hoped, meet the local needs of the future; and, when its reservation has been accomplished, alienation in the rest of the district can be proceeded with without reference to the Forest Department.

The proposal made in 1922 to add to the Bukit Lagong reserve in the Ulu Selangor and Kuala Lumpur districts a cancelled mining lot of 244 acres and about 1,880 acres of high land omitted from the reserve when it was originally constituted was notified, as was also the proposed extension of 6,014 acres to the Gombak reserve in the Kuala Langat district on the hills between that reserve and the Ampang Reserve and southwards towards the Kanching Road.

In the mangrove forests 5,450 acres were preliminarily notified for reservation and 3,229 acres were actually reserved. With the reservation of the 5,450 acres now awaiting settlement, all the Selangor mangroves will have been reserved or alienated with the possible exception of some small areas in the Kuala Selangor district.

9. **NEGRI SEMBILAN.**—No orders were passed on the proposal made in 1922 to reserve about 300 acres of mangrove forest on the Linggi River. Formal proposals to reserve the land referred to in paragraph 4 were submitted to the Resident, but a notification issued only in respect of 1,700 acres adjoining the Bukit Tunggal Reserve in Selangor.

The settlement of the Bukit Galla Reserve of 12,200 acres is still in progress.

The settlement of the Angsi Reserve and the survey and mapping of its boundaries having been completed, a draft final notification was under consideration at the end of the year. It is now nearly seven years since this reserve, which will extend to about 30,160 acres, was proposed.

The Palong Reserve of 93,000 acres, which was settled in 1922, was finally gazetted in March, 1923, and the Lukut mangrove reserve of 1,959 acres in September. The proposed constitution of the Paroi Reserve 4 miles from Seremban on the Kuala Pilah Road was abandoned; but, by order of the Resident, this small area of about 27 acres is not to be alienated and is shown on the survey and land office maps as at the disposal of the Forest Department for use as a timber depot or for other purposes.

10. **PAHANG.**—The reservation as a soil protective measure of about 3,000 acres of hilly land between Beserah and Kuantan is under consideration, but no definite proposals were submitted. A proposed extension to the Lakum Reserve in the Temerloh district was negatived on the ground that the area was already a game reserve: game preservation and forestry need not however be antagonistic; so it is hoped that the decision may be reversed, and 94,000 acres of forest containing 40 tons of timber per acre, chiefly *meranti*, *seraya*, and *chengal*, be put to a profitable use.

In the inland districts progress with the settlement of proposed reserves was somewhat disappointing, and 408,600 acres have still to be dealt with. Of this area 130,000 acres were preliminarily notified during the year, namely an extension of 47,000 acres to the proposed Benus-Telemong Reserve in the Bentong district, and the proposed Tekai Reserve of about 83,000 acres in the Lipis district. Part of the Benus-Telemong extension may later be required for mining; but the preservation of most of it is necessary to prevent pollution of the streams on which the agricultural population depends, and to supply timber and fuel to possible future mines and to the towns of Karak and Bentong. Though not rich in the more valuable species, this forest "is remarkable for its magnificent clean-barked trees of enormous size". The proposed Tekai Reserve containing an abundance of the less valuable dipterocarps was settled, and the final notification was approved shortly after the close of the year. The only addition to the reserves of the inland districts was an extension of 9,464 acres to the Kemasul Reserve, which was notified at the end of 1922.

In the Pekan district on the other hand, where the population is sparse, excellent progress was made. The Pontian mangrove reserve of 470 acres was settled and notified, and additions of 170,000 acres to the Lesong Reserve and 88,500 acres to the Aur Reserve were preliminarily notified, settled, and reserved. The Lesong extension is unusually rich in dipterocarps, and the Aur extension contains good *balau* on almost all rising ground.

III.—ALTERATION IN AREA.

11. The following statement, of which details are given in Form I, summarises the changes during the year in the area and distribution of reserved forests, apparent errors being due to the elimination of fractions smaller than a tenth.

Perak gained 140,757 acres by new reservation and 131 acres by recomputation of the area of the Behrang Reserve, and lost 563 acres by excisions as follows:

- (i) Three hundred and six acres formerly cut out of the Pondok Tanjong Reserve for the use of the Agricultural Department and now to be alienated.
- (ii) Seventy-eight acres in the Larut Hills Reserve for kampongs for Malays in the Batu Kurau mukim.
- (iii) One hundred and seventy-four acres in the Bubu Reserve in the mukim of Sungai Tinggi for agricultural purposes.
- (iv) Five acres in the Kroh Reserve for a Chinese cemetery.

Selangor gained 3,229 acres by new reservation and lost 851 acres by excisions, namely:

- (i) Forty-six acres of non-mangrove forest in the Kuala Bernam Reserve, which had already been encroached upon for rice-cultivation.
- (ii) Seven hundred and forty acres of not very valuable forest in the Kuang Reserve, which was needed in connection with the formation of a Malay reservation.
- (iii) Sixty-five acres of the Circular Road plantation in Kuala Lumpur for building sites.

Negri Sembilan gained 94,959 acres by new reservation and gave up an irregular area of about 128 acres, which unduly lengthened the boundary of the Jelai-Gemas Reserve.

Pahang gained 268,434 acres by new reservation; it lost 8,867 acres by recomputation of area after survey, and 310 acres excised from the Jelai Reserve for gold-mining.

The result of these changes was a net increase to the recorded area of reserved forests of the Federated Malay States of 496,791 acres.

State.		Area in square miles of reserved forests				Percentage to whole State on 31st December, 1923, of		
Name.	Area in square miles.	on 1st January, 1923.	added during the year.	excluded	on 31st December, 1923.	reserved forests.	State land.	alienated land.
Perak	7,800	1,211.8	220.1	.9	1,431.0	18.3	62.5	19.0
Selangor	3,200	572.6	5.0	1.3	576.4	18.0	47.2	34.8
Negri Sembilan	2,550	429.1	148.4	.2	577.2	22.6	49.2	28.2
Pahang	14,300	1,438.4	419.4	14.3	1,843.5	12.9	83.5	3.6
Total	27,850	3,651.8	793.0	16.7	4,428.1	15.9	70.4	13.7
1922	27,850	3,526.4	126.5	1.0	3,651.8	13.1	73.2	13.7
1921	27,850	2,913.6	614.0	1.3	3,526.4	12.6	74.0	13.4
1920	27,850	2,877.9	35.9	.2	2,913.6	10.4	76.2	13.4
1919	27,850	2,792.4	87.0	1.4	2,877.9	10.3	76.4	13.3
1918	27,850	2,241.5	551.1	.3	2,792.4	10.0	77.1	12.9
1917	27,850	1,911.6	333.4	3.5	2,241.5	8.1	79.3	12.6
1916	27,850	1,832.5	79.7	.55	1,911.6	6.9	81.2	11.9
1915	27,850	1,590.8	359.3	117.7	1,832.5	6.6	82.1	11.3

IV.—SUMMARY OF PROGRESS OF RESERVATION.

12. The progress of reservation since 1915, when the writer assumed charge of the department, and during the last five years is indicated in the following statement:

Particulars.	1915. Acres.	1919. Acres.	1920. Acres.	1921. Acres.	1922. Acres.	1923. Acres.
Reserves finally constituted during the year	215,083	54,786	22,865	392,969	72,765	507,379
Proposed reserves preliminarily gazetted and in various stages of settlement	190,789	790,189	1,112,821	735,924	838,118	787,026
Reservation under consideration but not yet preliminarily notified	430,800	365,000	500,000	633,000	825,000	278,000
Total area of reserves at the end of the year	1,172,784	1,841,856	1,864,721	2,256,882	2,337,178	2,833,969

The area of forest already reserved seems enormous, and it may be thought by some to be excessive. The following extract from the report of the Deputy Conservator of Forests, Selangor, may be a little pessimistic, but it shows that the position is not as rosy as it appears, and that in the more fully developed parts of the country extreme care will have to be exercised. In connection with the fact that 18 per cent. of the State is reserved he writes:

“This figure.....is likely to give rise to hopes that cannot possibly be gratified—hopes that the State of Selangor can be self-supporting in the supply of forest produce. As far as firewood goes it may be so.....The question of timber is very serious, as the following classification of the reserves shows:

Type of Forest.	Area, square miles.	Percentage of State.	Possibility of Increase.
1. Mangrove forest	128.3	4.0	Very little
2. Gutta-percha	3.1	.1	Perhaps
3. Inland swamps	54.4	1.7	About 100 sq. miles available
4. Hills under 1,000 feet	41.1	1.3	About 20 sq. miles available
5. Water catchment areas	18.9	.6	?
6. Hills over 1,000 feet	171.2	5.4	About 100 sq. miles available
7. Experimental areas	0.1	.0	
8. True timber forest	159.3	4.9	About 20 sq. miles available
TOTAL	576.4	18.0	

"The forests of the first two types cannot ever produce timber; those of the third may perhaps, if much capital is put into them, but at present can only just satisfy local native requirements; those of the fourth type are valuable, but are from their topography and situation very costly to exploit; those of the fifth are closed to exploitation for fear of pollution; while those of the sixth contain little of value, and from their topography and inaccessibility are very unlikely ever to become an economical source of supply to areas in the plains. The 5 per cent. of existing timber forests in the plains, perhaps increased to 6 per cent. if the Kerling valley can be reserved, are the only reliable source of supply. The inaccessibility of most of these forests retards their use; for careful, though profitable, operations are required before the timber can be exploited."

V.—DEMARCATIION.

13. New work amounting to 188 miles cost \$3,350, i.e., \$17.82 per mile, including the cost of boundary plates bought in previous years, and in some cases the cost also of boundary surveys. In 1922 and 1921 the cost was \$38.84 and \$25.80 respectively; but comparisons are not of much value, as so much depends on the situation of the reserve and the nature of the work to be done. Repairs to 2,636 miles cost \$5,801 or \$2.20 per mile, compared with \$1.43 in 1922. The total length of boundaries, including the demarcated boundaries of proposed reserves, is now estimated to be 4,239 miles, of which 255 miles do not need demarcation at present. The total expenditure incurred during the year was \$9,695. Details are given in Form II.

VI.—SURVEYS.

14. Details of the work done are given in Form III.

15. Four inch topographical maps of the forest reserves in the more fully developed parts of the Peninsula are urgently needed for the compilation of working plans and to facilitate exploitation. Survey Department work was however confined to making boundary traverses, which were completed for the Behrang Reserve in Perak, the Pahang Reserve in Negri Sembilan, and the Jelai, Kechau, Krau, Kerdau, and Bukit Raka Reserves in Pahang. The expenditure on these and minor surveys is stated to have been \$17,172.

16. Forest Department work, which cost \$911, consisted of about 172 miles of rough prismatic compass traverses, chiefly of new reserve boundaries, felling areas, and paths.

17. Nothing more was done in connection with aerial surveys, but it is hoped that the matter will receive further consideration on the arrival of the naval aeroplanes in Singapore. It is of interest to note that the Burmese mangrove swamps, which are more extensive than ours, but are as yet in a very early stage of development, are already being surveyed from the air.

CHAPTER II.

MANAGEMENT OF FORESTS.

I.—REGULATION OF MANAGEMENT.

(a).—*Preparation and Control of Regular Working Plans.*

18. There are still no regular working plans, but progress has been made towards compiling one for the Matang mangrove forests in Perak and another for the Sungai Buloh Reserve in Selangor. A number of rough felling schemes are in force.

The results of the work of the past 19 years in the mangrove forests were carefully studied by Mr. Sanger-Davies, and the general lines on which a detailed plan can be drawn up were under consideration at the end of the year. A number of sample plots for the calculation of volume increment were also established. Nothing more than a somewhat rough working scheme is however possible until we possess reliable stock maps, and for the preparation of these we must await either an aerial survey or an increase to the staff of trained forest officers which will enable the work to be done from the ground.

The proposed plan for the Sungai Buloh Reserve is the work of Mr. Rambaut and is being based on enumeration surveys made in 1921.

19. The need for working plans is becoming more pressing each year, and in the mining districts is already serious. So long as timber and firewood were available on alienated land, or on land about to be alienated, the situation could be dealt with; but such land in accessible localities is almost exhausted, and there is a constantly increasing demand on the inland reserves. It has been found possible to carry out fellings of considerable intensity on the inland plains without detriment, and indeed with improvement, to the forest; but in five or six years we shall have taken almost all we dare from these forests, and we know little or nothing, either economically or sylviculturally, of exploitation from the hills except that it is likely to be extremely expensive in the absence of improved methods of extraction. The railway having ceased to use wood-fuel, the mangrove swamps can probably be relied

on to supply the necessary fuel to the tin dredges in the neighbourhood of Taiping for the 15 to 20 years of their probable existence, after which the mangrove fuel will become available for other purposes. The permanent solution of the threatened difficulty seems however to lie in the Perak River hydro-electric power scheme, the progress of which is being watched with interest.

(b).—*Annual Plans of Operations.*

20. Annual plans of operations were drawn up as usual, and were adhered to as closely as the financial position and other circumstances allowed. Good natural regeneration having been secured, the planting of mangrove in Perak was unnecessary to the extent that was anticipated, and in Selangor money allotted to mangrove planting was diverted to experimental work thought to be of greater importance. Gutta-percha tapping was reduced owing to the fall in the market, and the arrangement to pluck gutta-percha leaves in the reserved forests of Pahang for sale to the Selborne Plantation Co. fell through. The damar operations in Negri Sembilan were continued with success, but the output is still considerably less than was expected owing to want of labour; want of labour also to a large extent prevented the collection of damar from the many thousands of trees that have been tapped in Perak and Pahang. Exploration was not carried out in Negri Sembilan as proposed, and changes were made in the building programme in Pahang owing chiefly to the removal to Mentakab of the office of the District Forest Officer, Temerloh, and to the abandonment of work by the Pahang Timber and Jungle Produce Co. In Selangor more new reserve boundaries were cut than was expected, and certain lengths of road, for which provision was not made in the plan, were metalled or otherwise put in order to facilitate the extraction of firewood.

II.—COMMUNICATIONS AND BUILDINGS.

(a).—*Communications.*

21. A sum of \$3,096 was spent on metalling about 30 chains of road through Bujang Estate from the railway station to the Sungai Buloh Reserve, and on rebuilding the bridge over the Sungai Gasi. About half a mile of road through Sedgeley Estate was also put in order at a cost of \$681. These are the first of many permanent cart-tracks which will certainly have to be opened up and maintained by Government to facilitate the removal of firewood from reserved forests. At present firewood-cutters make their own earth tracks, which are not only temporary but are extraordinarily wasteful of material, the corduroying of wet places probably consuming almost as much wood as is brought out.

The Public Works Department maintained a number of approach roads to checking stations.

22. The only new paths constructed were $1\frac{1}{4}$ miles in compartments 3, 7, and 12 of the Behrang Reserve and $3\frac{1}{2}$ miles in compartments 5 and 10 of the Trolak Reserve in Perak at a total cost of \$337, or about \$70 a mile. Repairs were carried out for the most part by the subordinate staff, coolies being employed only for the heavier work. It is estimated that 392 miles of path were repaired at a cost of \$1,533, or \$3.91 per mile, compared with 460 miles at \$3.09 per mile in 1922.

23. Details of the expenditure on communications, amounting in all to \$5,843, are given in Form V.

(b).—*Buildings.*

24. Details of the work done and expenditure incurred are given in Form V.

25. The Controller of Timber Supplies and his staff moved over to the Forest Office in Kuala Lumpur during the year, and the accommodation has again become inadequate in spite of the addition of a new room and the transfer to the department of one of the magistrates' courts. The museum is also getting crowded, and room is available neither for storing the rotans, nor for the important economic investigation into their classification and trade values. The question of providing further accommodation for the Forest Department by building new courts was under consideration during the year, but no decision was arrived at.

26. New work included the room already mentioned, a combined damar store and subordinates' quarters at Sumpitan in Upper Perak, an office at Mentakab, and subordinates' quarters at Mentakab, in the Tebong and Sendayan Reserves in Negri Sembilan, and in the Kanching Reserve in Selangor to replace quarters accidentally burnt. The total expenditure incurred on new work was \$5,076 by the Forest Department and \$8,205 by the Public Works Department compared with \$5,188 by the Forest Department and nothing by the Public Works Department in 1922.

27. Buildings were kept in repair as far as possible, the expenditure being \$8,421 by the Forest Department and \$5,687 by the Public Works Department compared with \$7,810 and \$4,787 respectively in 1922.

(c).—*Other Works.*

28. A sum of \$1,771 was spent, chiefly on drains, wells, fences, and the maintenance of compounds. Details are given in Form V.

III.—PROTECTION OF FORESTS.

(a).—Protection against Man.

(i).—CHANGES IN THE FOREST LAW.

29. Three officers were empowered to compound forest offences and the following changes were made in the Forest Enactment and Rules.

- (a) "Tusks and horns" were removed from the definition of "Forest produce" in section 2 of the Forest Enactment, and from class 3 in Schedule I to the Forest Rules, these products being now provided for under the Wild Animals and Birds Protection Enactment and no longer taxable under the Forest Enactment.
- (b) The definition of "firewood" in rule 2, which was based entirely on size and had long been unsatisfactory, was amended so that timber of any size can now be classed as fuel if it is suitable only for use as fuel or is lawfully cut with the *bona-fide* intention of using it for no other purpose.
- (c) At the instance of the Controller of Timber Supplies provision was made for the registration of property and classification marks, in order to secure recognition of such marks in courts of law.
- (d) A clause was added to rule 2 empowering the Ruler of the State in Council, notwithstanding anything contained in the rules, to enter into special agreements granting the sole right to exploit forest produce without limit of time or area. This new power was granted in pursuance of the policy of decentralization, and has already been exercised in connection with the grant of a concession to cut bamboos for paper pulp.

(ii).—FOREST OFFENCES.

30. The number of forest offences reported rose from 836 in 1922 to 864 in the year under review, and there was a corresponding increase in the number of offenders from 1,105 to 1,279. In Perak there was little change; in Selangor an increase of 50 per cent. is attributable almost entirely to the Chinese fishermen of the Coast District, who, having destroyed almost everything accessible on Pulau Ketam, are now attacking the reserved forests; a decrease of 50 per cent. in Negri Sembilan is unexplained; and a small increase in Pahang is due to the better control resulting from the appointment of an additional officer to the Kuantan district. Most of the offences were of a petty nature and were dealt with leniently, but heavy punishments were as a rule inflicted by magistrates for illicit mining in reserves and for the unauthorised extraction of gutta-percha and damar. The profits on illicit dealings in damar and gutta-percha must be large; offenders were prepared to pay as much as \$300 rather than go to prison.

31. Cases pending from 1922 were 13 in number and involved 17 persons; 865 cases involving 1,282 persons were disposed of during the year; and 11 cases involving 13 persons were pending at its close. Of the 865 cases disposed of 199 involving 298 persons were taken into court, 597 involving 855 persons were dealt with departmentally, and 69 involving about 129 persons were undetected. It is gratifying to note that the number of cases taken to court was 53 less than in 1922. Negri Sembilan and Pahang report only two undetected cases each.

32. Convictions were secured in 94 per cent. of the cases taken into court, and, with perhaps one exception, the punishments awarded appear to have been adequate. Of the 262 persons convicted two were imprisoned without the option of a fine, 228 were fined, and 32 were cautioned, the average fine being \$32 per person and \$45 per case compared with \$24 and \$30 respectively in 1922, cases in which the accused were discharged with a caution being included in the calculation.

33. Of the 597 cases disposed of departmentally four ended in acquittal; the remainder were compounded for an average of about \$12 per case and \$8 per person compared with \$13 and \$10 respectively the previous year. One offender who had agreed to compound a case absconded without paying. All the undetected cases were written off.

34. No account is taken in these calculations of fines of \$5,006 for breaches of permits or agreements to work forest produce, of the sale proceeds of seized and confiscated produce amounting to \$9,765, and of compensation of \$598 awarded by magistrates for damage to trees or timber.

35. Details for each State are given in Form VI.

(b).—Protection against Animals and Insects.

36. The only new form of damage to report is that done by boring beetles to tapped Jelutong trees, for which the liberal use of tar was found a good remedy. Mangrove seedlings, *rotan sega* planted in the shade of the forest, and gutta-percha fruit suffered as usual from their regular enemies, regarding which information is given in the report for 1922. Various methods were tried to protect fruiting gutta-percha trees in the Putat Reserve in Pahang, but none were successful and most of the fruit was lost: a few monkeys were shot and strips of white cloth and tins of rattling stones were hung in the trees; even the presence of coolies in huts built under the trees had no material effect.

(c).—Protection against Plants.

37. There was a slight recurrence of attacks by *Rosellina bunodes* on camphor seedlings in the Kanching Reserve in Selangor, which was successfully dealt with by pulling up and burning the injured plants. Other noxious plants are removed as far as possible in improvement fellings and cleanings, of which 5,550 acres were carried out during the year. Special care was taken to remove climbers and parasites from gutta-percha trees in the Putat, Jahit, Benchah, and Mangsok Reserves in Pahang.

(d).—Protection against Injury from Natural and other Causes.

38. PERAK.—A large number of more or less isolated trees have been struck by lightning in the exploited compartments of the Parit Reserve, *meranti* being the principal sufferer.

39. SELANGOR.—The tin tailings swamp in the Sungai Lalang Reserve continues to spread down stream and a proposal to dredge it for tin was negatived; another similar swamp is forming in the Kanching Reserve. The erosion of Pulau Lumut and Pintu Gedong, and the extension of the new islands outside Pulau Tengah continue.

40. NEGRI SEMBILAN.—The examination of the proposed extension of the Jelai-Gemas Reserve showed that a large part of it had been severely damaged by wind, about 1,000 acres being completely destroyed. *Mengkulang* is reported to have suffered particularly severely.

IV.—SYLVICULTURE.

(a).—Natural Reproduction.

41. A special report on flowering and fruiting seasons was presented by the Forest Research Officer, and it is apparent that, at any rate on the western side of the Peninsula, flowering and fruiting are very uncertain and often localised in small areas; rainfall and atmospheric moisture seem to be the governing factors. The same species, though perhaps not the same tree, may flower and fruit more than once in the same year in the same neighbourhood; and some species flower more gregariously than others. The year was a good one for fruiting on the east coast and in Johore, but on the west coast, although most species flowered freely, there was not a phenomenal production of fruit. The following notes are taken chiefly from the reports of State Forest Officers.

PERAK.—*Taban merah* and *puteh* both fruited heavily at the waterfall, Taiping, in November and December. *Taban merah* also seeded fairly well in the south of the State, but bats and squirrels did much damage. It was a poor seed-year for mangrove, and there was no general seeding of other important species.

SELANGOR.—The year was a bad one for seed except in the Sungai Buloh Reserve. *Kapur* flowered in the Kanching Reserve but the fruit failed; a few *taban* flowers were seen in the Bangi Reserve, but none in the Rantau Panjang Reserve; *keruing* flowered in the Bangi Reserve in January and December, and fruit was to be found on the ground in most months of the year; *mempening* flowered in the Bangi Reserve in January; and in the Sungai Buloh Reserve in October there was a general flowering of *meranti pa'ang* and *penaga*, a sporadic flowering of *meranti sarang punai*, and a fruiting of *meranti rambai daun*. From the seed crop of December, 1922, in the Rantau Panjang Reserve 263,700 *taban* seeds were collected, of which 134,400 were taken by the Selborne Plantation Co. The Deputy Conservator reports that the natural regeneration resulting from the exploitation of Class II trees has been a conspicuous success wherever there is a fair number of dipterocarp seed-bearers, and this is the experience in other States also.

NEGRI SEMBILAN.—Good natural regeneration of *keruing*, *meranti*, and *seraya* was discovered while laying out paths in the Tebong Reserve, and a very remarkable growth of *taban* seedlings was disclosed under thick *resam* in the Senawang Reserve.

PAHANG.—This is the only State which reports a good flowering and fruiting season, with prospects of a good seedling crop of dipterocarps. The following trees are mentioned as having been observed in flower or fruit: *balau*, *berangan*, *bintangor*, *chengal*, *kelat*, *kempas*, *kemuning*, *keruing*, *kulim*, *leban*, *medang*, *mempening*, *meranti*, *merawan*, *merbau*, *nyatoh*, *petaling*, *rengas*, *ru*, *selimbar*, *sepetir*, *tembusu*, and *tualang*.

(b).—Artificial Reproduction.

(i).—REGULAR PLANTATIONS.

42. PERAK.—The mangrove plantations in the Matang Reserve were increased by about 35 acres planted 3' x 3' with *bakau minyak* seedlings. Part of this area is made up of small patches in which natural regeneration had failed. The cost was \$5.50 per acre, exclusive of supervision charges, which is somewhat heavy seeing that success cannot be guaranteed. On 23 acres of the area planted on Trong Island in 1922, where crabs are not plentiful, there have been very few losses, and the young plants are in good condition.

The experimental planting of *ipil* in the dry belt of the mangrove failed owing, it is thought, to the destruction of the seeds by rats.

No extension was made to the *rotan* plantations in the Pondok Tanjong Reserve. The area in the open which was stocked in 1922 with plants from the nursery has done very well, many of the plants having four or five stems up to 15 feet in length. Dibbling in the open proved a complete failure.

The *kepayang* on posts and wire in the Pondok Tanjong Reserve has made vigorous growth, but has not yet fruited; the flowers produced in August were barren. Most of the plants grown without supports are still alive, but have not done well.

43. SELANGOR.—The greater part of the Circular Road plantation in Kuala Lumpur was given up for building sites, and the block of 13 acres which remains is now in charge of the Assistant Forest Research Officer. The work in this plantation is now purely experimental and is dealt with in Chapter III.

An unusually large area of blanks in mangrove forest was planted by the staff, and a good deal of useful information is being compiled, but the crab menace has not yet been overcome.

Malabera was planted over about two acres in a blank in the Kapar Reserve with fair success, and the experiment is to be continued.

Didu and *letpan* from Burma were sown in the Kanching and Sungai Buloh Reserves, but germination was bad and favourable results are not expected; the climate is probably unsuitable. It was thought that these species, which grow very rapidly in their native country, would be useful for match-making.

44. There are no regular plantations in the other States.

45. At the end of the year the total area of plantations in charge of the department was 1,067 acres, the receipts and charges during the year being \$35 and \$1,137, compared with \$1,009 and \$1,449 respectively in 1922. Details are given in Form VII.

(ii).—CULTURAL OPERATIONS.

46. PERAK.—The *meranti* broadcasted in 1921 in the burnt area in the Parit Reserve continue to do well, and establish themselves with ease if given sufficient light. The *chengal* dibbled in in sawing sites in the Tanjong Toh Alang Reserve also continue to thrive, though no care is taken of them.

In the Batang Padang district large *taban* nurseries were made, and it is estimated that more than 100,000 healthy seedlings were raised, which will be planted out in the Trolak and Behrang Reserves on the first favourable opportunity. From the old *taban* nurseries 1,184 seedlings were planted out in compartments 1 and 3 of the Behrang Reserve.

47. SELANGOR.—The broadcast sowing of camphor made in 1921 in the Kanching Reserve was abandoned as a failure; hardly a seedling survived except in openings; shade and animals destroyed the rest. Preparations were made to stock with seedlings areas from which the tall trees had been removed, but no seed became available for the proposed nurseries, although the trees flowered profusely. The line-planting of transplanted natural seedlings done in 1922 was also an almost complete failure, probably because the seedlings used had for long been suppressed.

Taban planted in 1918 in compartment 2, and in 1919 in compartment 9, of the Rantau Panjang Reserve were cleaned and gives promise of success. A new *taban* nursery was made in compartment 1 to provide for future requirements.

48. NEGRI SEMBILAN.—A scheme of work was drawn up and approved for the Senawang Reserve, under which about 240 acres in the south-west of that forest will be specially treated in favour of the *taban*, *penak*, and other valuable species which have been dibbled or planted there. The carrying out of this scheme has been much facilitated by finding a market for firewood of Class II species in Seremban; the necessary work can now be done at a profit. Where *taban* is most plentiful heavy improvement fellings have been made, and *taban* has been dibbled or planted in the blanks with a view to obtaining a more or less pure crop of *taban* for seed-production and tapping. It has been found that dibbling is much cheaper than planting, and seedlings raised in this way seem healthier than transplants. In the *penak* area a similar procedure is being followed; *penak* has been dibbled in blanks but use will be made also of the natural regeneration of dipterocarps and other valuable species, and no attempt will be made to secure a pure crop. In some cases it is contemplated to grow the comparatively short *taban* under an overwood of the much loftier *penak*. An area of 84 acres was treated at a cost of \$300, which includes the cost of nurseries and seed-collection, but nothing for supervision. The results so far obtained are full of promise, but further heavy expenditure will undoubtedly be necessary for some years to secure the young *taban* from suppression. What prompted the Deputy Conservators of 15 to 20 years ago to introduce *penak* and other trees into a forest where they did not before exist is not clearly recorded; success has been secured at a price and we are now almost compelled to follow their lead; but events indicate that it would probably have been more profitable, so close to a large town, to have concentrated on the production of quick-growing *meranti* suitable for firewood and cheap planking.

49. PAHANG.—Nothing was done in this State except by the patrol guards, who paid a small amount of attention to the line-planting of *chengal* and *kulim* in the Bilut Reserve.

50. Further details not needing comment are given in Form VII. The total expenditure during the year was \$2,098 on new work and \$365 on maintenance compared with \$203 and \$81 respectively in 1922.

(c).—Operations for the Improvement of the Growing Stock.

51. PERAK.—All *taban puteh* was removed from the *taban* area near the waterfall in the Larut Hills Reserve in order to avoid the danger of cross fertilization with *taban merah*, which is of special value here for seed-production.

In the Pondok Tanjong Reserve the undergrowth round 61 old *chengal* trees was cleared, and more than 4,000 saplings and seedlings are said to have been freed; but the cost (\$181) seems excessive in comparison with the area dealt with, as only a small part of the young crop is likely to reach maturity. Clearing was also done round about 1,350 *chengal* trees in the Ijok Reserve ostensibly to facilitate damar-tapping, and here again it is doubtful if the outlay of \$994 will be remunerative in spite of the freeing of some 10,000 seedlings, or whether, as regards damar-tapping, it was entirely justifiable or even necessary. No such clearing has been needed in Negri Sembilan, and the admission of light may possibly accelerate the darkening of the damar.

Improvement fellings and cleanings in favour of Class I seedlings and saplings were carried out at a cost of \$2.63 per acre over 621 acres in compartments 1 and 3 of the Parit Reserve, which had already been worked for firewood and almost completely regenerated naturally.

In the Behrang and Trolak Reserves 822 acres were re-treated with improvement fellings with the object of securing a pure growth of *taban merah*. The expenditure, including the cost of freeing the crowns of about 800 trees to encourage seed-production, was \$4.33 per acre, which is heavy, but will almost certainly prove to be fully justified now that a market is being found for the fellings.

52. SELANGOR.—In this State, as in Perak, the exploitation of Class II timber for mining poles and firewood serves the purpose of an improvement, or even regeneration felling, and the results have been extremely satisfactory both financially and sylviculturally. To ensure success, exploitation must however be followed by cleanings, owing to the thick growth of undesirable softwoods and other weeds which invariably follows the admission of light. Special attention was paid to these cleanings in the Rantau Panjang and Bangi Reserves, and with increasing experience their cost, which varied during the year from about \$1.50 to about \$6 per acre, is gradually being reduced.

Improvement fellings in areas where exploitation is at present impossible were repeated in part of compartment 3 of the Sungai Lalang Reserve at a cost of \$2.20, and in part of compartment 15 of the Sungai Buloh Reserve at a cost of \$6.66 per acre. Countings in the Sungai Lalang Reserve suggest that the postponement of retreatment during the war has resulted in the loss of the greater part of a valuable crop of seedlings. The work in the Sungai Buloh Reserve was an attempt to clear up the problem of regeneration in hill forest, and the high cost is due to the heaviness of the operation.

The Weld's Hill Reserve was maintained as usual by a small permanent gang of coolies, who are available also for other work.

It is interesting to note that only \$2,727 were spent on the treatment of forests which are economically worked, and that the revenue from the same forests was \$31,704.

53. NEGRI SEMBILAN.—The conditions in Negri Sembilan are radically different from those obtaining in Perak and Selangor, in that there is at present practically no demand for Class II timber and poles. The Negri Sembilan system consists therefore of periodic comparatively light improvement fellings designed to ensure the presence of enough Class I seedlings and saplings to regenerate the area when its economic exploitation becomes possible. The work is fairly cheap, but cannot be carried out profitably for an indefinite period; the prospects of a demand for Class II timber from Negri Sembilan are therefore particularly welcome. During the year 1,101 acres in the Senaling Inas, Seriting, and Pasoh reserves were retreated at a cost of \$2.80 an acre, in addition to combined improvement fellings and exploitation over 89 acres in the Senawang Reserve.

54. PAHANG.—Very heavy improvement fellings were carried out in favour of gutta-percha in the Putat, Jahit, Benchah, and Mangsok Reserves, and more than 35,000 trees are stated to have been assisted at a cost of only \$2.04 per acre for 1,709 acres. Reclining trees were pollarded and have thrown out strong shoots. The whole of the Putat, Jahit, and Mangsok Reserves have now been treated at least once, and the trees assisted in previous years already show marked improvement owing to admission of light and freedom from lateral pressure.

Improvement fellings were again carried out for experimental purposes over 74 acres of Sample Plot 3 in the Bukit Goh Reserve.

55. Details of the work done are given in Form VII, the total expenditure during the year being \$16,594 compared with \$15,818 in 1922.

V.—EXPLOITATION.

(a).—*Timber, Fuel, and Charcoal.*

(i).—GENERAL DISCUSSION.

56. Details under this head are given in Form VIII and in Appendix B.

57. The reviving demand for timber and fuel resulting from the return towards the end of the year of some measure of prosperity is an outstanding feature of the year. In 1922 royalty was paid on 107,477 tons of timber and poles compared with 158,491 tons in 1921; there was also in 1922 a fall from 568,242 to 515,062 tons in the outturn of fuel and charcoal: in the year under review the outturn of timber and poles rose to 110,896 tons and of firewood and charcoal to 539,705 tons. Of particular interest are the figures for sleepers in Appendix B, which show that the number paid for in 1921, 1922, and 1923 were 277,041, 19,320, and 63,464 respectively. The demand in 1923 was far greater than this; it could not however be satisfied, because the stopping of purchase in 1922 completely broke up the organization for producing sleepers; kongsi houses were abandoned, carts and cattle were sold, and labour was dispersed. It is desired only to state the results of, not to criticise, action which was perhaps unavoidable; it is proving terribly costly, and the difficulty of reorganising the sleeper industry has made it necessary to place orders for sleepers abroad.

58. The revived demand for both timber and fuel, combined with the gradual exhaustion of the accessible forest on State land and the diminution of the fuel supply from thinnings in the rubber plantations, has led to considerable increases in price, and the market still shows an upward tendency. Cartmen too are often rapacious in their demands, and as much as \$2.60 has been paid for carting 70 cubic feet of firewood over $4\frac{1}{2}$ miles of good road near Kepong, with the result that motor lorries are now being entered into competition with the bullock carts.

(ii).—SOURCES OF SUPPLY.

(a)—RESERVED FORESTS.

59. PERAK.—The total outturn of timber, fuel, and charcoal for which payment was made was 187,317 tons compared with 164,660 tons in 1922, the greater part of the increase being mangrove firewood.

No changes were made in the system of exploiting the Matang mangrove swamps. The reduction in the size of the coupes and their division into blocks, of which not more than two may ordinarily be worked at one time, have proved advantageous by ensuring more systematic work and better supervision. Two coupes of 600 and 186 acres were closed during the year, and gave the satisfactory yield of 86 and 79 tons and revenue of \$105 and \$97 respectively per acre. Equally good results are expected from the coupes of 1922, all of which were still being worked at the end of 1923. New coupes aggregating 2,453 acres were opened during the year.

In the Lower Perak district the output of the mangrove forests amounted to 1,969 tons compared with 1,574 tons in 1922, and was consumed entirely by the fishing villages.

The Parit, Tanjong Toh Alang, Kledang-Saiong, Chikus, and Kroh Reserves were worked on a fairly large scale for timber and fuel, and a small amount of work was also done in the Trolak and Behrang Reserves. In most cases exploitation was limited to Class II trees and dead and fallen trees of Class I, the permit in some cases specifying that the trees to be cut must first be marked by a forest officer. The outturn was 30,654 tons compared with 13,445 tons in 1922, most of it being consumed in the mines. At the end of the year a light railway with steam traction was being laid from the Tanjong Toh Alang Reserve to a mine $1\frac{1}{2}$ miles from the reserve. Man-power trolleys on rails are in use in the Chikus and Kroh Reserves.

60. SELANGOR.—In this State the outturn of timber and poles increased from 3,648 to 5,419 tons, and of fuel and charcoal from 71,110 to 88,671 tons.

No important change was made in the working of the mangrove coupes except the substitution of a monthly premium as long as the work lasts for the lump sum premium payable in three instalments within six months of the beginning of work. The latter system undoubtedly led to coupe-holders remaining in their coupes longer than necessary in order to have a supply of firewood in hand in case of emergency. Thirty-four coupes aggregating 4,492 acres were under exploitation during the year, and work was finished in 12 coupes of 1,475 acres. The outturn per acre, profit per acre, and profit per ton for the finished coupes were the same as in 1922, namely 59 tons, \$49, and 84 cents respectively. The fishermen in many cases did not avail themselves of the privilege of free fishing stakes, preferring to buy them from a contractor in the usual way.

In 1922* about 22 per cent. of the inland firewood on which royalty was paid came from the forest reserves: in 1923 the percentage had risen to 59, although felling in reserved forests is carefully supervised and Government receives rather higher payment than for similar material from State land. The demand on the inland forest reserves for firewood is steadily increasing and can only be met by the construction of good roads, the areas accessible to the bullock cart being already on the point of exhaustion. The wastefulness of corduroyed earth roads has already been commented on in paragraph 21. The reserves most extensively worked during the year were the Sungai Buloh, Kanching, and Bukit Tunggul, the output being mainly timber, fuel, and poles of Class II species. The removal of previously marked superfluous Class I trees is also allowed in certain cases, such as the felling of *jelutong* in the Sungai Buloh Reserve for making matches. Smaller outturns were yielded by dead trees in the Rantau Panjang Reserve and by Class II poles in the Cheraka, Ayer Itam, Gombak, Rantau Panjang, and Kuang reserves.

61. **NEGRI SEMBILAN.**—There was a fall from 1,037 to 756 tons in this State, the only output of importance being 718 tons from improvement fellings in the Senawang Reserve. There was no demand for mangrove fuel from the Sepang reserve.

62. **PAHANG.**—The reserves of Pahang yielded only 547 tons, of which 423 tons were from the Rompin Mangrove Reserve for the use of launches on the Rompin river, and 124 tons cut in the Lesong reserve during mining operations.

(b).—FROM STATE AND ALIENATED LAND.

63. The outturn of wood from state and alienated land on which payment was made fell from 381,613 tons in 1922 to 367,891 tons in the year under review. In the more fully developed parts of the country state land is getting exhausted, and it is therefore not surprising to find a decreased output from the Kinta district of Perak, and an increased output from the Kuala Kangsar, Batang Padang, and Lower Perak districts to make good the deficiencies elsewhere. None of the state land in southern Perak can however be depended on for more than a few years' supply. Selangor is in an almost worse position than southern Perak, and the output fell from 70,519 to 53,612 tons. Negri Sembilan is still comparatively well off, at any rate in the eastern half, and the output rose from 22,154 to 28,314 tons, chiefly on account of the increased extraction of sleepers. Pahang has large quantities of timber on State land for which at present it is impossible to find a market, and there was a decrease of 3,872 tons in the total output due to the much reduced demands of the Railway Construction Department for fuel, and to the gradual working out of the forests in the Rompin valley; on the other hand the outturn of sleepers from the inland districts was 33,625 compared with 3,743 in 1922, and towards the end of the year many new licences to cut timber for sleepers were issued.

64. A five years' agreement to exploit timber over about 1,654 acres in the Batang Padang district was signed, and a small sawmill was erected at Behrang Railway Station; but the work done under the agreement was spasmodic and the outturn of timber disappointingly small. The Pahang Timber and Jungle Produce Company ceased operations in the Temerloh district, but the sawmill of Lim Hiong Kee at Mentakab was re-opened. Negotiations for a timber concession on State land adjoining the Belingu reserve were abortive.

(b).—Other Forest Produce.

(i).—GENERAL DISCUSSION.

65. Details under this head are given in Form IX. The principal sources of revenue are damar, gutta-percha, and canes.

66. *Damar.*—The departmental working of *damar penak* (or *damar chengal*) has now been thoroughly established in Negri Sembilan, but progress in the other States is disappointing owing to the almost entire lack of suitable labour. Even in Negri Sembilan the output is far below what was expected, but lack of quantity is made up for by excellence of quality. The grades adopted by the department were quickly established, and sales are now made to Europe and America f.o.b. Singapore without samples, buyers being satisfied with the signed guarantee placed in each case. It is stated that the Singapore dealers are now copying the methods of the Forest Department, and a departmental trade-mark is about to be registered. To prevent all possibility in the early stages of the industry of any variation in quality it has been decided that all grading for export shall be done at Kuala Pilah, even though this may be rather more expensive than grading locally; local grading would necessitate a form of guarantee, and possibly a separate trade-mark, for each State, which would at once invite comparison of qualities and encourage buyers to discover (or invent) reasons for lowering prices. The market now seems secure, and the outturn at present is not large enough to be split up.

Negri Sembilan had the initial advantage of an efficient, if somewhat inadequate, labour force accustomed to the work of damar tapping and brought up to climb to the branches of the largest trees, from which the best quality of damar is obtainable. This force has now been supplemented by immigrants from the Dutch Indies, 50 families of whom have been settled at Langkap under their own "raja". A small area of padi and kampong land, which

may not be sold to others, is given to each settler, and \$1 is paid for each *penak* tree brought into full bearing. More than 1,000 trees have already been tapped by them and will soon be a permanent source of income. It is estimated that a Malay damar tapper can, if he wishes, earn not less than \$20 a month in addition to the income from his padi fields and other sources; a whole-time tapper can earn very much more.

In Perak and Selangor the Malays cannot be persuaded to take much interest in the industry; they are too well off. In Pahang there was great difficulty at first, but practical demonstrations during the agricultural show at Temerloh, at which all the Penghulus of the district were present, seem to have had some effect. Demonstrations were also given in the Raub and Bentong districts with beneficial results. The position at the end of the year was that in Perak we had about 13,000 tapped trees with practically no collectors, and in Pahang more than 17,000 trees with an inadequate number of collectors. There was perhaps some lack of foresight in allowing such extensive tapping in Perak, where a small number of Chinese and Malays, attracted by the favourable rates offered for bringing new trees into bearing, earned unexpectedly high wages and are now unwilling to take to the less lucrative work of collection. In Negri Sembilan the mistake of too extensive tapping has been, and in Selangor will be, avoided, Negri Sembilan having now only about 7,000 tapped trees. The solution of the labour difficulty seems to lie in the introduction of more foreign settlers, preferably Malays, and this matter is receiving special attention. It may also be possible to organise gangs of local Chinese who will spend their whole time on the work.

The results of the year's work in Negri Sembilan are an indication of the possibilities of this newly organised industry.* The outturn of graded damar (including a small quantity of *damar mata-kuching*) was 125 pikuls a month, including 21 pikuls from Perak and Pahang; the expenditure debited to the damar vote during the year was \$33,568 and the corresponding revenue was \$87,532. If to the expenditure debited to damar is added the estimated cost of establishment and other overhead charges the profits, notwithstanding a falling market, were about \$23 a pikul, compared with a former royalty of \$2, and the recently revised royalty of \$5 per pikul. The whole of the revenue, with the exception of a commission of $2\frac{1}{2}$ per cent. to the selling agents in Singapore, goes to the Government and the collectors; better work is demanded of the collectors, but they are better paid, and protected against the theft by other collectors of damar from the trees they have tapped; and a number of useless middlemen, who formerly took most of the profits, largely at the expense of the collectors, have been eliminated. These successful results are due largely to the zeal of Mr. Borges, Extra Assistant Conservator of Forests, whose retirement shortly after the close of the year owing to sudden and serious illness is recorded with great regret.

Owing to a falling market, to depletion of supplies, and possibly also to returning prosperity decreasing interest was shown in the inferior damars, the outturn of which fell from 20,258 to 14,293 pikuls. The Coast district of Selangor alone showed a substantial increase. In Pahang the inferior damars were exploited partly departmentally and partly by licensees. The profits from departmental working are larger than the revenue from licences, but the trade is of little importance and will be left to private enterprise.

Special attention is being paid to the damar—especially the *damar penak*—exhibit at the forthcoming British Empire Exhibition, and it is confidently anticipated that we shall gather there and from consumers in England information which will be directly profitable to the Government.

67. *Gutta-percha (getah taban merah)*.—The market for this product is a very uncertain one. The cable companies, which are the principal consumers, have their own purchasing organisation, and are unwilling to buy tapped gutta from the Forest Department at what is considered a fair price, although this gutta is admitted to be the best available: the Forest Department on the other hand objects to selling its product to dealers in Singapore, where it is mixed with other guttas of inferior quality and loses its identity. All efforts to establish a market in England have hitherto failed, and, prices being somewhat low, it was therefore decided to send a consignment of about one ton of gutta of the highest quality to the British Empire Exhibition, with the object of getting into direct touch with the consumers, of giving them the opportunity to compare our product with what is produced elsewhere, and of learning what the market really wants. The annual production of tapped gutta is small, and it may perhaps be better to seek a market amongst the smaller consumers rather than amongst the cable companies, whose demands are far greater than we can satisfy. One small parcel of tapped gutta was sold to a European firm in the Federated Malay States for \$425 a pikul; for the rest the ruling price was about \$300.

Owing to the poor market, to the exhaustion of trees on state and alienated land, and to the scarcity of trees again ready for tapping in reserved forests, the output of tapped gutta fell; the only State to show an increase was Negri Sembilan, where tapping was undertaken for the first time. The wisdom of reducing tapping owing to a fall in the market is doubtful: if tapping is postponed now, future tappings will also have to be postponed, and within a given period less gutta-percha will probably be produced; gutta-percha can be stored if necessary, and a profit is always certain.

* See appendix D.

The revenue on leaf gutta, which is produced only in Pahang, increased owing to the larger output from Mr. Holbrook's factory at Kuala Lepar. Mr. Davidson's factory at Kuala Tembeling started work. Both these factories are supplied with leaves from Government forests. The factory on the Selborne Plantation Company's estate, which is also now running, gets most of its leaves from the estate; but about 2 tons of leaves from state forests were purchased from licensed collectors, who paid a small amount of revenue to the department. Arrangements to supply the estate with leaves on a large scale fell through.

The Selborne Plantation Company paid the annual rent of \$850 for their right to collect seed in part of the Trolak Reserve, and as usual bought small quantities of seed from the department.

68. *Canes*.—There was a rise of \$2,920 in the receipts from canes, but royalties were increased in 1922, and the quantity extracted was probably rather less than in that year. Most of the increase was in Pahang.

The condition of the cane industry is as unsatisfactory as that of the damar industry early in 1922. Wembley is expected to teach us much of market demands and the commercial classification of the rotans, and to facilitate greatly the thorough reorganisation of the industry which the department contemplates. Further information in this connection is given in paragraphs 81 and 92.

69. *Getah jelutong*.—Increasing interest has been manifested in this product, which is used for the manufacture of chewing gum, for water-proofing various fabrics, and in mixture with gutta-percha and other products for electrical insulation purposes. The revenue of the year was \$2,347. Nearly 2,000 pikuls of the refined product were turned out from Mr. Gild's factory at Jerantut, and a number of licences and permits were applied for and issued in Perak and Selangor. Prices improved and seem to depend largely on the methods of refinement, about which producers maintain great secrecy. The industry has been revived almost entirely by private enterprise, and is worthy of encouragement, though the revenue produced is inconsiderable. The only danger to be anticipated is the damage or destruction of the trees by insects owing to improper tapping. If the industry expands the question will arise, as it has already arisen in the case of *chengal*, whether the trees should be exploited primarily for gutta or for timber.

70. Other products, which include *tengar* bark, *nibong*, bamboos, *nipah*, *getah puteh*, *petai* fruits, Para and wild rubber, and wood-oil, do not need mention in any detail. The permits to take *tengar* bark from the mangrove reserves continue to be appreciated and are an increasing source of revenue. Bamboos were extracted in larger quantities than in 1922 chiefly for use in the tin mines, and at the end of the year a concession was granted to the Malay Industries Development Syndicate to take bamboos for paper pulp from parts of the Upper Perak district. An unusual item is about 3 cwts. of *getah lembu Jawa*, or *getah jualoh*, sold to the Medical Department for making fly-paste. The small rubber plantation at Taiping was opened to tapping on contract towards the end of the year to recover the cost of maintenance.

(ii).—SOURCES OF SUPPLY.

(a).—Reserved Forests.

71. Increased revenue was yielded under all important heads except gutta-percha, the outturn of which fell from 7,946 to 3,160 lbs. for the reasons given in paragraph 67. The revenue on this product would have been greater but for the despatch of a large quantity to the Empire Exhibition.

72. The actual weight of damar extracted fell owing chiefly to the decreased output of *damar batu*, but the revenue and profits increased enormously owing to the introduction of departmental working of *damar penak*. Separate figures for the latter for reserved forests and for state and alienated land cannot be given.

73. The revenue on canes rose from \$3,572 to \$5,166 mainly on account of the increased rate of royalty; and miscellaneous products yielded \$7,061 compared with \$2,366 in 1922 owing almost entirely to the receipts from *tengar* bark permits in Selangor.

(b).—State and Alienated Land.

74. Form IX shows a decrease of revenue, but this is due to the inclusion under reserved forests of a considerable revenue on damar, a separate account of which cannot be kept. Gutta-percha (tapped) alone shows a real decrease. Wild rubber, which is almost entirely *jelutong*, is an increasingly important item, the output having risen from 13,270 pounds with a revenue of \$398 in 1922 to 296,187 pounds with a revenue of \$2,297 in 1923.

(c).—Summary of Outturn.

75. The outturn of all kinds of forest produce is summarised in the following statement, produce cut free of royalty being excluded. Apparent errors are due to the elimination of fractions.

Kind of produce.			From reserved forests.	From other forests.	Total	
					for the year.	for the previous year.
Timber and poles	...	Tons	12,555	98,341	110,896	107,477
		Rev. \$			449,139	301,810
Fuel and charcoal	...	Tons	270,155	269,550	539,705	515,062
		Rev. \$			570,307	449,347
Canes	...	...	5,166	22,789	27,954	25,034
Rubber	...	...		296,187	296,187	13,270
		lbs.				
		Rev. \$	85	2,297	2,382	413
Gutta-percha	...	...	3,160	18,133	21,293 <i>a</i>	23,893
		lbs.				
		Rev. \$	4,107	4,124	8,232 <i>b</i>	38,406 <i>b</i>
Gutta-percha leaves	...	...		170.57	170.57	
		pkls.				
		Rev. \$		85	85	
Damar	...	...	4,904.24	11,115.83	16,020.07	23,450.66
		Pkls.				
		Rev. \$	91,358 <i>c</i>	12,145	103,503 <i>c</i>	27,001 <i>d</i>
Other produce	...	...	7,061	14,827	21,887	14,263
		Rev. \$				
Total revenue	...	\$	...	...	1,183,492	856,274

(a) Includes leaf gutta and about 3,290 lbs. of tapped gutta sent to the British Empire Exhibition.

(b) Excludes \$850 paid by the Selborne Plantation Company for seed-collecting area in the Trolak Reserve.

(c) Includes \$87,532 from sale of damar worked by departmental agency in reserved and unreserved forests, which cannot be shown separately.

(d) Includes \$8,963 from sale of damar worked by departmental agency in reserved and unreserved forests, which cannot be shown separately.

CHAPTER III.

ECONOMIC FORESTRY, SYLVICULTURAL EXPERIMENTS, RESEARCH, AND EDUCATION.

I.—STAFF.

76. The Forest Research Officer (Dr. Foxworthy) and his assistant (Captain Woolley) were on duty throughout the year, and Mr. Barrett, Assistant Conservator of Forests, was specially employed for several months on experimental work connected with the sylviculture of gutta-percha. The work accomplished was satisfactory, but amounted only to a small fraction of what is necessary and would prove profitable. All officers of the department did what they could to help, and most useful assistance was also rendered by the Agricultural, Survey, Museums, and Railway Departments, and by the Director of Botanical Gardens, Singapore.

77. The need of a whole-time forest chemist is urgent, and the appointment of one has been recommended to government in connection with a proposal to centralise chemical work. Other needs are a sylviculturist and an officer who can devote his whole time to experimental planting. The appointment of an economist was sanctioned temporarily, but the post was not filled till after the close of the year.

II.—EXHIBITIONS.

(a).—The Agri-Horticultural Show at Kuala Lumpur.

78. A small display, chiefly furniture of local woods, was made at this show in July, the preparation and arrangement of the exhibits, which attracted much attention, being in charge of the Assistant Forest Research Officer. Sales of exhibits amounted to \$2,040, and the profits more than covered the special expenditure on the exhibition. These direct profits are however of minor importance; evidence is accumulating that the work of recent years on the introduction of new timbers is bearing fruit, and during the year the Liew Fatt Weng Timber Company opened a small factory at Ipoh, where ornamental and little-known woods such as *sepam*, *buey*, *sepetir*, *langkap*, *rengas*, and *sentul* are regularly utilised. It is thought that the carpenters and furniture makers should now be given a chance to demonstrate their enterprise, and at the 1924 show there will be classes for the exhibit of furniture and other articles of local woods.

(b).—*The British Empire Exhibition, 1924.*

79. This exhibition took up a great deal of the time of almost all officers, and research work proper, both in the field and at head-quarters, was hindered; but there have been compensating advantages, such as the acquisition of additions to the forest museum and to the photographic collection. The forest section of the Malaya pavilion will unquestionably pay—as the Malaya-Borneo exhibition paid—not by the sale of exhibits, but by what is learnt of trade conditions and trade requirements. Floor space of 5,000 square feet has been allotted to the department, and the exhibits despatched filled about 150 cases of about 60 cubic tons.

80. Having little or no timber for export it was at first decided not to exhibit any; but, when British North Borneo decided it could not take an official part in the exhibition, it was agreed to make a small display for all British Malaya, most of the exhibits being supplied by the large timber company now operating in British North Borneo, and by the Johore Government. Wall-planks, floors, walking-sticks, and small ornamental objects will be shown, together with descriptive labels, charts, and coloured photographs.

81. The rattans will be represented by whole plants and by the raw and finished material of the commoner species, and will be illustrated by specially prepared pen-and-ink drawings. Canes up to 540 feet in length have been secured to stretch round the walls, and walking-sticks of Malacca and other canes will be for sale. Surplus supplies of the commercial canes have been sent, so that samples can be furnished to manufacturers.

82. A fairly complete series of the commercial damars will be exhibited, special attention being given to Malayan *damar penak* and the methods employed in its collection. Arrangements have also been made for the supply of samples to manufacturers.

83. Great importance (vide paragraph 67) is attached to the gutta-percha exhibit, which will illustrate the methods of collection and preparation of the different kinds of gutta-percha, and will include samples of the finished product and various articles manufactured from it.

84. *Jelutong* is being shown by Mr. Harry Gild of Singapore together with a series of photographs taken for the department illustrative of its collection and manufacture.

85. The Bakau Syndicate of Sandakan, British North Borneo, is displaying Borneo cutch, which will be accompanied by a series of pictures of the mangrove swamp plants from the bark of which the cutch is made.

86. No attempt is being made to bring together a complete collection of Malayan forest products; the space available is inadequate: a purely utilitarian plan is being followed, and attention is being concentrated on the few products which have already begun, or ought in the near future, to be a valuable source of revenue. Pamphlets dealing with the three most important products—gutta-percha, damar, and canes—have been prepared and will be on sale at a nominal price. But the most important guarantee of success is that two competent forest officers will be constantly on duty during the period of the exhibition, one of whom will be available to visit manufacturers and others to find out the best methods of disposing of our products.

III.—SYSTEMATIC STUDY OF THE FOREST FLORA AND FOREST PRODUCTS.

(a).—*Systematic Botany.*

87. The herbarium is becoming inconveniently crowded, and room is badly needed for the careful study and comparison of species. Plants received during the year numbered about 1,400, of which more than half were collected locally by officers of the department. Of foreign material received the most noteworthy is a collection of 400 sheets of Philippine plants from the Bureau of Science, Manila, specially selected to facilitate the study of Malayan species. Large numbers of duplicate specimens await distribution to Kew and other herbaria, but pressure of other work has prevented attention being given to this. The Director of the Botanical Gardens, Singapore, again gave the most valuable assistance in the work of identification. The second volume of Ridley's "Flora of the Malay Peninsula" was received during the year.

88. Special attention was again given to the Dipterocarpaceae, large numbers of which family were in flower or fruit during the year. Useful material was secured of a number of critical species, and more might have been done, had it been possible to arrange for more field work. Particularly valuable collections were received from Johore, which show that light may be thrown on the distribution of species by further collections in that State. Collections also show that there is need for careful comparative study of the Malayan species and those of Borneo and the Dutch Indies, between some of which there is very close relationship. Arrangements have therefore been made to secure collections from Sarawak, and exchanges of material are being made with Buitenzorg, where the dipterocarps are being studied by Dr. van Slooten. As examples of new knowledge acquired the following may be mentioned. The *selimbar* of the sea coast near Kuantan is now known to be *Shorea glauca* King, and identical with the *damar laut daun besar* of the Dindings; another tree of the same name occurring in the Bukit Goh Reserve is a form of

Lumnus closely related to *Shorea ciliata* King; and a third, found in the Baloh Reserve and known also as *balak tiaong*, seems to belong to an undescribed species of *Pachychlamys*. *Chengal* or *penak* is now definitely known to be *Balanocarpus Heimii* King and possibly *Balanocarpus Wrayi* King, and not *Balanocarpus maximus* King, to which it has for several years been credited in the records of the department. No progress was made with the proposed publication on the genus *Dryobalanops* owing to inability to secure the necessary plates, and the monograph on the dipterocarps is unlikely to be ready for publication for six or seven years, though it is hoped that within two years the most important points now in doubt will have been elucidated sufficiently to allow of the manual referred to in paragraph 91 being published.

89. Little progress was made with the study of the Sapotaceae, but it is hoped to do more during the current year with the help of Mr. Dolman, Assistant Conservator of Forests, who has volunteered his assistance.

(b).—*Commercial Timbers and Timber Trees.*

90. The collection of foreign timbers has not been noticeably increased, but several hundred additions were made to the reference collection of Malayan timbers, chiefly from Kedah, Johore, and Fraser's Hill. The Kodak Company of Singapore have produced some very good photographs of woods with a magnification of about five diameters, and the series, when complete, will be invaluable for illustrating future publications and for the study of wood structure.

91. Further work was done on the proposed manual of the commercial timber trees, and by the end of the year descriptions of thirty trees had been drawn up. Difficulty is being experienced with the illustrations; about 500 photographs, of which many are very good, have been taken, but it is impossible to get satisfactory reproductions made in this country. If this difficulty could be overcome, the manual should be ready for publication in about two years, and the solution would appear to be to equip the Survey Department with the necessary apparatus.

(c).—*Minor Forest Products.*

92. RATTANS.—The foundation for work on the rattans was laid in 1921 by forest officers in Pahang, and the work has been steadily, though slowly, continued since then. During the year more than 200 specimens of whole canes were received from different parts of the Peninsula, including a particularly good collection of 106 specimens from Negri Sembilan. Existing descriptions have been made mainly from fragmentary dried specimens, and it is unfortunate that so little space is available in Kuala Lumpur for the study of the complete plants. Records have been kept of the exact measurements of each rattan in the collection, and careful pen-and-ink drawings have been made of the leaves and, if possible, of the fruits; and it is hoped that within five years it will be possible to publish a fairly complete descriptive account of their botanical status and technical values, and possibly of their behaviour under cultivation.

93. DAMAR AND COPAL.—Certain of the damars were further investigated by the chemists of the Agricultural Department, and the results show that there is little difference in chemical composition between the different commercial grades of *damar penak*, though the darker grades give a darker solution and are therefore less valuable. *Damar penak* dust, when melted and freed from impurities, solidified into a very dark mass for reasons which are obscure, and it is still hoped to discover a satisfactory treatment. Other damars examined by the Agricultural Department were *damar mata-kuching* and *damar sipul*. Generally speaking, the results have served chiefly to prove the need for further work and for the appointment of a whole-time chemist to undertake it.

Copal or *damar minyak* was examined at the Imperial Institute, and the report received was on the whole favourable; but the damar does not appear to exude in this country in the same solid form as in the Philippines, and one or two of the trees experimented on in the Larut Hills have actually died as the result of tapping.

A field investigation of the damars was begun by Mr. Phillips, and this, when complete, should furnish much useful information as to the sources of the less known forms.

IV.—EXPLOITATION AND UTILIZATION.

(a).—*Timber.*

94. COMMITTEE ON WOOD-WORKING.—This Committee met early in the year and recommended the installation of plant for the artificial seasoning, antiseptic treatment, and testing of timber. It was suggested that the work should be on an experimental scale large enough to give results applicable to commercial practice, and that, as regards timber testing, the methods should be standardised with those followed in India. It was however considered that the results obtained in India, and the urgent need to make use of such common timbers as *keruing* in place of the diminishing and more valuable species, justified the immediate installation of a fairly large plant for the antiseptic treatment of sleepers. The estimated cost of the plant was \$100,000. The general scope of the scheme was approved, but on reference to Dehra Dun it was found that the cost had been very much underestimated, and at the end of the year it was arranged that the committee should again consider the matter.

95. **NEW WOODS AND WOODS FOR SPECIAL USES.**—Reference has been made in paragraph 78 to the progress that has been made in the use of new woods, and little need be added here. Reports on *tempinis* heartwood for golf-club shafts are unfavourable, but local players speak well of shafts made of the sapwood, and this is being investigated. Amongst ornamental woods *buey*, which is a streaked ebony, and *sepam*, a species of *Mangifera*, have attracted the most attention; but *buey* is rare and occurs only in small sizes, and *sepam*, which, when carefully selected, makes handsome furniture, is not thought to be common.

Furniture making on a small scale was continued, and not only paid its way but afforded useful information about the suitability of certain woods for special uses. Neither staff, space, nor equipment is however adequate at present to carry on extensive experimental work of this nature.

96. **SEASONING EXPERIMENTS.**—A drying shed—far smaller than is really needed—was completed on Court Hill in Kuala Lumpur at the beginning of the year, and tests were begun immediately. The principal difficulty was to obtain planks for test in really good condition, owing to the unsatisfactory methods of conversion and handling by the Chinese. Logs are therefore now sent to the Central Workshops to be sawn, but many get split owing to the want of a log-pond and of a stacking yard protected from the sun. A detailed report of the results obtained during the year has been received, but it is too long to reproduce here in detail. Measurements to determine shrinkage and specific gravities are taken monthly, and it is expected that within a year results for a number of the woods tested will be available. Within the first two months there is a very rapid loss of moisture; after this the variation seems to be closely related to the atmospheric conditions. A special test was made with certain freshly cut woods to determine which could be used without seasoning, the test pieces taking the form of miniature table tops, 9 inches square, made of strips of wood, 3 inches wide and $\frac{1}{2}$ inch thick, tightly glued and pinned together, and with strong battens nailed across the back. In many cases the shrinkage drew the pieces apart within a few days. Of the 29 woods tried it appears that *nyireh*, *keledang*, *jelutong*, *sanai*, *meranti Pahang*, and *teruntum* need only a month or two of seasoning; radial sections of *pengarawan penak*, *meranti sarang punai*, *meranti tembaga*, *meranti rambai daun*, and *meranti kepong* may be used after two to three months; the rest must be seasoned for a more prolonged period. The Controller of Timber Supplies has shown that outdoor seasoning of properly stacked softwood planks can be satisfactorily carried out; but he notes that machine-cut timber seems to season better than hand-cut, and suggests that this may be due to the more even surface of the former.

97. **DURABILITY TESTS.**—These have followed the lines of previous years, and it is hoped the results will be ready for publication in 1926 or 1927. At the beginning of the year 1,777 pieces had been, or were still, under test, and to these 693 untreated pieces were added. The total number of species tested is about 130, each species being represented as far as possible by about 25 pieces. Results so far indicate that the most durable of the local woods in an untreated condition in contact with the ground are *serai*, *chengal*, *kumus*, *nyireh batu*, *betis*, *jahor*, and *sama rupa*, all of which, after three years or more in the ground, have lost by destruction less than 8 per cent. of their volume. *Resak* shows the unexpectedly high loss of two-thirds of its volume after $4\frac{1}{2}$ years compared with $3\frac{1}{2}$ per cent. loss after $3\frac{1}{2}$ years in the case of the closely allied *kumus*.

98. **PRESERVATIVE TREATMENT.**—Tests with wood preservatives applied under pressure are not yet possible. A series of tests was however started with 25 kinds of preservatives supplied by local sale-agents, all possible care being taken to ensure that the conditions of the tests were uniform. The woods used were *meranti*, *kepong*, *keruing*, and *kapur*. A single tree of each species was selected and cut into pieces of equal size; the pieces were then seasoned for six months, and the preservative was applied cold in a tank. The total number of pieces placed in the testing ground was 1,599, including 99 untested pieces for comparison of results. These will be examined yearly and will, it is hoped, yield useful information.

99. **MECHANICAL TESTS.**—Nothing more was done; the results obtainable with the only available machine are not sufficiently reliable to justify the expenditure of time and labour on further tests.

(b).—Other Products.

100. Additional supplies of bamboo were furnished to the Agricultural Department for the continuation of experiments in the manufacture of paper-pulp, and it is understood that an exhibit of the pulp is being prepared for the Empire Exhibition. No progress was made by the company which holds a concession for wood-distillation. The experimental tapping of *damar minyak* has had to be temporarily discontinued, but the arrangements for a comprehensive series of experiments in the tapping of *damar penak*, designed to give information about tapping methods and probable yields under different conditions and from different parts of the tree, are almost complete. Useful information on the tapping and yield of *getah jelutong* was accumulated by Mr. Phillips, Deputy Conservator of Forests. Valuable reports, based on information collected while on leave, were submitted by Mr. Barnard, Deputy Conservator of Forests, on the conditions of trade in England in damar, gutta-percha, and canes, but, generally speaking, efforts to get into closer touch with the consumers of such products were disappointing.

V.—SYLVICULTURE.

101. Excluding the damar-tapping plots in Negri Sembilan, 43 sample-plots for the calculation of growth rates or for silvicultural experiments have been established since the first was laid down in 1915. One of these was abandoned in 1921, and a second at the end of the year under review as no longer of any value. During the year four new plots were formed, and ten were in process of formation. At the close of the year there were 45 established plots containing more than 5,000 measured trees. These plots are becoming a very great tax not only on State and District forest officers, but also on the Conservator, and the much needed additions to their number cannot be made till a whole-time silviculturist is available to take charge of them. During the year records for certain species were compiled, and owing to doubt, especially in regard to the dipterocarps, the identification of about half the measured trees was verified. It is hoped to complete the work of identification in the current year, and a report is being prepared by the Forest Research Officer, which will be presented when all the plots have been examined, giving the identification of the trees and suggestions as to the future care and handling of the plots.

(b).—*Experimental Planting.*

102. Experimental plantations on a large scale have not been possible owing to the want of a suitable site. Planting on a small scale was continued in the Circular Road reserve in Kuala Lumpur, and twenty-seven out of fifty of the blocks into which the reserve has been divided have now been more or less completely planted up. There are now under cultivation 25 species of trees and other plants thought to be of silvicultural or economic value, including two exotics, and useful results are hoped for in the near future. Careful record was maintained as usual of germination results, rates of growth, and other particulars.

(c).—*Gutta-percha.*

103. Mr. Barrett, Assistant Conservator of Forests, continued the work on gutta-percha referred to in detail in paragraphs 118 and 119 of the report for 1922, but was obliged to take leave at the end of the year on account of his health. A series of sample and experimental plots has now been established, but it is too early to report results. It may however be mentioned that certain senior officers of the department, to whose opinion the writer attaches great weight, do not agree with the opinion expressed last year that "the end in view in the management of our gutta-percha forests must . . . for a long time be the production of an adequate number of seed-bearing trees . . . combined with leaf-production and possibly tapping"; in their view we should concentrate attention on the production of seed and the specially valuable tapped gutta, leaving leaf-production, which is an agricultural proposition, to the planter.

VI.—ENTOMOLOGY.

104. Very little time was available for work under this head. Twelve more families of insects are now represented in the reference collection, and a type collection for instructional purposes is gradually being arranged in the museum, special attention being paid to the Coleoptera. Nearly 200 additional specimens (exclusive of duplicates) were added to the general list; a special card index by species is maintained also. Unknown specimens are now being sent to the Imperial Bureau of Entomology, to which the department is indebted for prompt identifications. Breeding specimens are dealt with in the Agricultural Department, which has been most helpful. Special thanks are also due to Mr. Pendlebury of the Museums Department both for indentifying specimens and for advice.

VII.—PUBLICITY AND EDUCATION.

105. The only publications sent to the press during the year were the three pamphlets on rattans, gutta-percha, and damars prepared for the Empire Exhibition. Nothing was published.

106. The museum was used for several months for storing and packing exhibits for Wembley, which interfered with its use as a museum, but a number of additional exhibits of value were received. The great difficulty is lack of space. Visitors to the museum who recorded their names numbered 283, and included persons from England, America, Australia, India, Burma, Japan, Formosa, Sarawak, Hongkong, Sumatra, and the Philippine Islands.

107. A course of instruction in practical forestry was given to 14 selected Malay subordinates, including one subordinate each from Kedah, Johore, and Kelantan. Great keenness was shown by the Malays both to join the class and during the course of instruction, and the notes taken were most creditable. Making allowance for mistakes due to inexperience the experiment was undoubtedly a success, and it is hoped that it will be possible to repeat the course yearly until a school has been established. No other formal instruction was given except in connection with the English correspondence course in wood identification.

CHAPTER IV.

FINANCIAL RESULTS.

108. The following table shows the financial results of the year and compares them with the estimates and with previous actuals. The estimates exclude provision for the clerical establishment and for temporary allowances, whereas the actual expenditure under personal emoluments includes those items, amounting during the year to \$172,427. Figures for the timber branch, which works on a suspense account and showed a small profit after payment of interest on loans from the Government, are also excluded.* A change has been made by allotting to each State the salaries of State establishments disbursed at head-quarters, and the surplus or deficit column now corresponds more nearly than before with actual facts. Complete accuracy is however impossible so long as such important items as pensions and expenditure on buildings are met from non-departmental votes.

State.	Revenue.	Expenditure.			Surplus or deficit.	Percentage of expenditure to revenue, and remarks.
		Personal emoluments.	Other charges.	Total.		
	\$	\$	\$	\$	\$	
Head-quarters ...	677	117,506	18,185	135,691	-135,015	Apparent errors in this statement are due to the elimination of cents
Perak North ...	323,469	85,205	34,234	119,439	+204,030	
Perak South ...	372,472	83,242	28,959	112,201	+260,270	
Selangor ...	194,532	85,109	31,943	117,052	+77,480	
Negri Sembilan ...	176,939	76,376	56,705	133,081	+43,858	
Pahang West ...	78,734	56,229	34,757	90,986	-12,251	
Pahang East ...	62,333	32,916	11,085	44,001	+18,332	
Total ...	1,209,156*	536,583†	215,868	752,451	+456,705	62.2
Approved Estimates, 1923 {	959,300	467,066	587,300	854,366	104,934	89.1
Revised {	1,025,375					
Actuals, 1922 ...	888,115	529,981‡	190,647	720,629	167,486	81.1
Average actuals for five years, 1917-21	1,324,015	395,829	589,760	985,589	338,426	74.4

* Excludes \$12,800 recovered from the Colony on account of salaries and temporary allowances, and credited to item 27 of the Federal Estimates 1923.

† Includes \$4,564 arrears of 1922 salaries and temporary allowances paid in 1923.

‡ Includes \$9,404 arrears of 1921 salaries and temporary allowances paid in 1922.

109. The results are satisfactory beyond all expectation, and are due partly to increased royalties and the handsome revenue yielded by the damar industry, but chiefly to returning prosperity and the increased demand for timber and fuel. It was predicted in the report for 1922 that 1923 would show results not much inferior to the average for past years, though the surplus was not likely at present to equal the record of over \$500,000 in 1918: the results are better than the average of past years, and the surplus is the third highest on record. It is now confidently anticipated that the surplus of 1924 will exceed all records; but a substantial part of this and future surpluses should be used for purposes of development, such as the establishment of a forest school and properly equipped research laboratories, sawmills, and seasoning plant, and the introduction of improved methods of timber extraction.

CHAPTER V.

ADMINISTRATION AND GENERAL.

110. SENIOR ESTABLISHMENT.—The writer was in charge of the department throughout the year except from the 21st June to the 7th October, 1923, when he was on deputation to the Empire Forestry Conference in Canada, and when his duties were carried out by Mr. A. E. Sanger-Davies. Mr. E. A. Strouts joined the Department from Cambridge as an Assistant Conservator in September, 1923; the other officer who was expected at the same time surrendered his appointment and could not be replaced during the year. Several retirements of senior officers being expected in the near future, and the deputation of officers to Johore and Kedah being likely to be permanent, it was decided to recruit enough

* See appendix C.

officers to replace those on deputation and to fill existing or expected vacancies in the establishment already sanctioned. The larger scheme of 1921 was given further consideration by the Government, but no orders were passed during the year. Sanction was, however, accorded to the temporary appointment of Mr. Phillips, Deputy Conservator of Forests, as Forest Economist, but he could not assume charge of his duties during the year. No logging engineers were appointed, and the number of temporarily employed Europeans was reduced to one by the resignation of Mr. McCarthy. Mr. J. G. Watson was on deputation to Johore as Acting Conservator of Forests throughout the year, and Mr. Bell filled the same position in Kedah till the 11th October, 1923, when he was relieved by Mr. C. Smith.

111. **LOCALLY RECRUITED ENGLISH-SPEAKING ESTABLISHMENT.**—The revised scheme for Sub-Assistant and Extra Assistant Conservators was sanctioned with effect from the 1st January, 1922, and the locally recruited English-speaking staff is now entirely separated from the Malay subordinate staff. The scheme is not entirely suited to certain officers now in the service, and partly on this account, and partly on medical grounds, the retirement of three Extra Assistant Conservators of Forests was under consideration at the end of the year. Messrs. F. J. Mitchell and A. M. Askey were retired for reasons of economy and efficiency. No new appointments were made, but in December two probationers for the post of Sub-Assistant Conservator of Forests were selected for practical training locally in 1924. Mr. Bain remained on deputation in Johore throughout the year. Mr. Foston secured a nomination for training at the Forest College, Dehra Dun, and Mr. Bain is to be sent to Rangoon University College, where training in Forestry has recently been started.

112. **SUBORDINATE FOREST STAFF.**—State Forest Officers either speak well of, or do not mention, the work of the Malay subordinate forest staff, and the absence of complaints is perhaps due to the weeding out of inefficient to effect economies. The sanctioned staff was reduced from 504 in 1922 to 444 in the year of report, but it cannot long remain at this low figure. During the year there were 13 resignations, 11 retrenchments and retirements, 10 dismissals, and 4 deaths. The health of the staff was not uniformly good, and the Deputy Conservator of Forests, Selangor, mentions the prevalence in the Rawang sub-district of tuberculosis, which caused the resignation of three men, of whom one shortly afterwards died. Final orders were not passed on the revised salary scheme.

113. **CLERICAL STAFF.**—There have lately been fewer transfers of clerks to and from the department, and, for this reason perhaps, the clerical work has been more efficiently performed. A member of the retrenchment committee recorded that “for half the month at least the clerk or clerks in the outstations have nothing to do and do nothing”. Nothing could be further from the truth. The Deputy Conservator of Forests, Perak North, writes “It is rarely that the day’s work in any office can be finished within the prescribed hours. This is not, and should not be, regarded as a grievance, as the prescribed hours do not constitute a full day’s work”. This is true of offices outside Perak and particularly of the office of the writer, who wishes to put on record that, whatever the standard of their efficiency, his clerks invariably give willing service and often voluntarily attend office on holidays to complete work left undone. Inefficiency is chiefly found amongst the Malay writers.

114. **MISCELLANEOUS STAFF.**—Changes in the miscellaneous subordinate staff need not be mentioned.

115. **CONTROL OF TIMBER SUPPLIES.**—On the 1st January the Controller of Timber Supplies and his establishment were transferred from the Railway to the Forest Department. The transfer was not effected without some difficulty, and several meetings between officers of the departments concerned were necessary to settle details. It had been decided, as the result of the slump, that the activities of what is now known as the Timber Branch of the Forest Department must be curtailed; consequently the sawmill at Gemas was closed and the accumulation of stocks ceased, until at the end of 1922 the Railway found that it was again essential to purchase sleepers. By this time however the sleeper-cutting industry was disrupted, and the energies of the timber branch have since been largely concentrated on reviving it, and at the same time on gradually disposing of the stocks of scantlings. At the end of the year therefore the timber branch was not in a position to undertake the work for which it was intended, the lumber industry was practically unorganised, and there were practically no stocks. Fortunately the financial position has now improved, and it is hoped during 1924 to make substantial progress towards the recovery of lost ground. The writer is convinced that Government must take the lead if the best use is to be made of the timber wealth of the country, and to do this it is necessary to improve the methods of exploitation, conversion, and utilization. All these matters were under consideration during the year, and recommendations have already been, or shortly will be made. The timber branch is an essential part of the necessary organisation; but it cannot fulfil its functions well and cheaply unless it can accumulate stocks and work on a large scale, and unless as far as possible all timber for public purposes is purchased through it.

116. CULTIVATION IN RESERVED FORESTS.—Progress was made during the year with the settlement of Malay padi cultivators on culturable land in reserved forests and with the subsequent excision from the reserves of the cultivated areas and kampongs. This method of land settlement was referred to in some detail in paragraph 12 of the report for 1922. Cultivation was extended in Perak in the Pasir Itam and Pondok Tanjong Reserves, but there is no progress to report in the Piah Reserve.

In Selangor the cultivators in the Bukit Cheraka reserve did well, and arrangements were completed for the excision from the reserve of about 4,710 acres of land which is of little value for forest purposes. On Pulau Lumut the crops suffered both from drought and flood, but it is expected that the question of the area to be excised from the reserve will be settled this year.

The settlement of foreign Malays in Negri Sembilan, which is referred to in paragraph 66, is almost entirely on State land, but similar settlements in reserved forests will be permitted if necessary.

117. ACKNOWLEDGMENTS.—The writer in conclusion desires once more to thank all ranks of the department for their cordial assistance. Efficiency is being increased by the recruitment of trained officers; but the volume of work is increasing also, and this, combined with the deputation of experienced officers to the Unfederated States, throws a continually heavier burden on the shoulders of the senior officers.

KUALA LUMPUR,
15th March, 1924.

E. CUBITT,
Conservator of Forests, F.M.S. & S.S.

APPENDIX A.

LIST OF TREES, ETC., MENTIONED IN THE REPORT.

Vernacular or English name.			Botanical name.	Uses.
Bakau minyak	...	...	<i>Rhizophora conjugata</i> , L....	Timber, firewood, fishing stakes
Balak tiaong	...	...	<i>Pachychlamys</i> sp. ...	Timber
Balau	...	...	<i>Shorea materialis</i> Ridley, and <i>Shorea collina</i> Ridley.	"
Batai	...	...	<i>Albizzia moluccana</i> Miq. ...	Firewood
Berangan	...	...	<i>Castanopsis</i> spp. ...	Timber
Bertam	...	...	<i>Eugeissonia tristis</i> Griff ...	Thatch
Betis	...	...	<i>Payena utilis</i> Ridley. ...	"
Bintangor	...	...	<i>Calophyllum</i> spp. ...	"
Buey	...	...	<i>Diospyros</i> sp. ...	"
Chengal	...	...	<i>Balanocarpus Heimii</i> King, and <i>Balanocarpus Wrayi</i> King.	Timber, damar
Damar-laut daun-besar	...	...	<i>Shorea glauca</i> King. ...	
Damar minyak	...	...	<i>Agathis alba</i> Foxw. ...	Timber, wood-oil
Didu (Burmese)	...	...	<i>Bombax insigne</i> Wall. ...	" matches
Getah jualoh	...	...	<i>Willughbeia</i> sp. ...	Bird-lime, fly-paste
" lembu Jawa	...	...	"	"
Ipil	...	...	<i>Intsia bijuga</i> O. Ktze. ...	Timber
Jahor	...	...	<i>Cassia siamea</i> Lam. ...	Ornamental wood-work
Jelutong	...	...	<i>Dyera</i> spp. ...	Timber, veneers, matches, clogs
Kapur	...	...	<i>Dryobalanops aromatica</i> Gaertn. f. ...	Timber, camphor
Kelat	...	...	<i>Eugenia</i> spp. ...	Timber
Keladan	...	...	<i>Dryobalanops oblongifolia</i> Dyer....	"
Keledang	...	...	<i>Artocarpus lanceaefolia</i> Roxb. ...	"
Kempas	...	...	<i>Koompassia malaccensis</i> Maing. ...	Timber, roof shingles, charcoal
Kemuning	...	...	<i>Murraya exotica</i> L. ...	Ornamental furniture
Kepayang	...	...	<i>Hodgsonia heteroclita</i> Hook. f. ...	Oil
Keruing	...	...	<i>Dipterocarpus</i> spp. ...	Timber, wood-oil
Kulim	...	...	<i>Scorodocarpus borneensis</i> Becc. ...	Timber
Kumus	...	...	<i>Shorea ciliata</i> King, and <i>Shorea costata</i> King.	"
Langkap	...	...	<i>Arenga obtusifolia</i> Mart. ...	Ornamental furniture
Leban	...	...	<i>Vitex</i> spp. ...	Boat-building and posts
Letpan (Burmese)	...	...	<i>Bombax malabaricum</i> DC. ...	Timber, matches
Malabera	...	...	<i>Fagraea crenulata</i> Maing. ...	Wharves and piles
Malacca cane	...	...	<i>Calamus Scipionum</i> Lour. ...	Walking sticks
Mangrove	...	...	<i>Rhizophora</i> , <i>Brugmiera</i> and <i>Ceriops</i> spp.	Timber, fishing stakes
Medang	...	...	<i>Litsaea</i> spp., <i>Micropora</i> spp., and other <i>Lauraceae</i> .	Timber
Mempening	...	...	<i>Quercus</i> spp. ...	"
Mengkulang	...	...	<i>Tarrietia simplicifolia</i> Mart. ...	"
Meranti	...	...	<i>Shorea</i> spp....	Timber, damar
" kepong	...	...	" <i>sericea</i> Dyer. ...	Timber
" pa'ang	...	...	" <i>Kunstleri</i> King. ...	"
" rambai-daun	...	...	" <i>acuminata</i> Dyer. ...	Timber, damar
" sarang-punai	...	...	" <i>parvifolia</i> Dyer. ...	"
" tembaga	...	...	" <i>leprosula</i> Miq. ...	"
Merawan	...	...	<i>Hopea</i> spp. ...	"
Merbau	...	...	<i>Azelia palembanica</i> Baker. ...	Buildings, furniture, sleepers
Nibong	...	...	<i>Oncosperma filamentosa</i> Bl. ...	Posts, flooring
Nipah	...	...	<i>Nipa fruticans</i> Wurm. ...	Thatch
Nyato	...	...	<i>Palaquium</i> and <i>Payena</i> spp. ...	Timber, inferior gutta
Nyireh	...	...	<i>Xylocarpus</i> (<i>Carapa</i>) spp. ...	" furniture
" batu	...	...	<i>Carapa moluccensis</i> Lam....	Furniture and tool handles
Penaga	...	...	<i>Mesua ferrea</i> Linn. ...	Timber
Penak	...	...	<i>Balanocarpus Heimii</i> King, and <i>Balanocarpus Wrayi</i> King.	Timber, damar

APPENDIX A—(cont.)

LIST OF TREES, ETC., MENTIONED IN THE REPORT—(cont.)

Vernacular or English name.				Botanical name.	Uses.
Pengarawan penak	...	...	...	Hopea sp. ...	Furniture, roof shingles
Petai	...	...	...	Parkia epeciosa Hassk. ...	Edible fruit
Petaling	...	...	...	Ochanostachys amentacea Mast. ...	Timber
Resak	...	...	...	Shorea barbata Brandis, and Vatica spp.	Timbers, sleepers
Rengas	...	...	...	Melanorrhoea spp....	Timber, furniture
Resam	...	...	...	Gleichenia spp. ...	A weed
Rotan sega	...	...	...	Calamus Caesius Bl. ...	Canes
Ru	...	...	...	Casuarina equisetifolia Forst. ...	Timber, firewood
Sama rupa	...	...	...	Shorea spp....	Timber
Sanai	...	...	...	Anisoptera sp. ...	"
Sentul	...	...	...	Sandoricum sp. ...	Ornamental furniture
Sepam	...	...	...	Mangifera sp. ...	Timber
Sepetir	...	...	...	Sindora spp. ...	Timber, veneers
Serai	...	...	...	Shorea sp. ...	Timber
Seraya	...	...	...	" Curtisii Dyer. ...	"
Selimbar	...	...	...	" glauca King. ...	"
Taban	...	...	...	Palaquium and Payena spp. ...	Gutta-percha
" merah	...	...	...	" Gutta Burck. ...	"
" puteh	...	...	...	" spp. ...	"
Tembusu	...	...	...	Fagraea gigantea Ridley. ...	Timber, sleepers, golf-shafts
Tempinis	...	...	...	Sloetia sideroxylon T. and B. ...	Timber
Tengar	...	...	...	Ceriops Candolleana Arn. ...	Tan bark, timber
Teruntum	...	...	...	Lumnitzera coccinea W. and A. ...	Bridges and wharves
Tualang	...	...	...	Koompassia parvifolia Prain. ...	Charcoal
Yemane (Burmese)	...	...	...	Gmelina arborea Linn. ...	Timber

APPENDIX B.

STATEMENT OF SLEEPERS PAID FOR DURING THE YEAR.

Species.	Class I No.	Class II No.	Class III No.	Cross- ing.	Rejec- tions.	Total.		Revenue.
						No.	Tons.	
								\$
PERAK NORTH.								
Merbau ...	1,898	195	...	...	12	2,105	95	919
Resak ...	113	23	...	...	...	136	6	58
Total ...	2,011	218	...	...	12	2,241	101	977
PERAK SOUTH.								
Chengal ...	402	345	...	...	132	879	40	301
Merbau ...	430	292	...	...	110	832	37	295
Tembusu ...	109	201	...	...	65	375	17	119
Resak ...	419	269	...	...	36	724	33	279
Meranti ...	...	...	...	...	29	29	1	1
Dedali ...	...	...	...	...	12	12	1	1
Total ...	1,360	1,107	...	...	384	2,851	128	997
SELANGOR.								
Chengal ...	26	38	...	...	...	64	3	24
Merbau ...	192	173	...	...	50	415	19	146
Tembusu ...	4	7	...	...	...	11	...	4
Petaling ...	...	...	...	...	1	1	...	...
Total ...	222	218	...	...	51	491	22	174
NEGRI SEMBILAN.								
Chengal ...	72	15	...	...	2	89	4	37
Merbau ...	4,263	570	...	5	32	4,870	220	2,115
Resak ...	9,186	6,341	971	27	2,061	18,586	839	6,687
Kumus ...	390	227	...	...	60	677	30	253
Keruing ...	...	...	...	...	34	34	2	9
Total ...	13,911	7,153	971	32	2,189	24,256	1,094	9,102
PAHANG WEST.								
Chengal ...	76	9	...	10	2	97	5	51
Merbau ...	12,524	5,407	...	...	847	18,778	845	7,462
Resak ...	8,604	5,605	...	39	502	14,750	667	5,801
Total ...	21,204	11,021	...	49	1,351	33,625	1,518	13,314
ALL STATES.								
Chengal ...	576	407	...	10	136	1,129	52	414
Merbau ...	19,307	6,637	...	5	1,051	27,000	1,215	10,938
Tembusu ...	113	208	...	...	65	386	17	123
Resak ...	18,322	12,238	971	66	2,599	34,196	1,545	12,826
Petaling ...	...	...	...	...	1	1	...	...
Keruing ...	...	...	...	...	34	34	2	9
Kumus ...	390	227	...	...	60	677	30	253
Meranti ...	...	...	...	...	29	29	1	1
Dedali ...	...	...	...	...	12	12	1	1
Total, 1923 ...	38,708	19,717	971	81	3,987	63,464	2,863	24,565
„ 1922 ...	10,100	5,955	754	338	2,173	19,320	900	3,973
„ 1921 ...	202,175	54,119	13,842	2,807	4,098	277,041	12,719	57,396

Apparent errors in this statement are due to the elimination of cents and fractions of a ton.

The numbers given for each species are only approximately accurate.

APPENDIX C.

TIMBER BRANCH.

ASSETS AND LIABILITY STATEMENT, 1923.

Assets.								\$	c.	Liabilities.								\$	c.
Accounts receivable	...	...	...	...	...	...	...	78,021	07	Capital advance account	...	...	...	...	...	...	...	100,000	00
Stock account, Sleepers	...	...	...	...	...	...	...	\$	2.15	Salaries and wages account	...	...	...	...	...	...	...	2,586	68
Logs	...	...	...	...	...	...	...	2,314.85		Accounts payable account	...	...	...	...	...	...	...	26,851	92
Scantlings	...	...	...	...	...	...	...	1,056.63		Retention money	...	...	...	...	...	...	...	385	94
									3,373 63	Profit and loss account	...	...	...	...	...	...	...	9,596	83 *
Inventory account, Stores, Stationery, etc.	...	...	...	...	...	...	...	2,865	46										
Capital assets account, Furniture	...	...	...	...	...	...	...	3,937	92										
Bank account	...	...	...	...	...	...	...	51,221	29										
Cash account	...	...	...	...	...	...	...	2	00										
									139,421 37									139,421	37

* From this should be deducted \$4,000 interest on capital advance and an item of \$393.80 for depreciation on the office furniture, etc., leaving \$5,203.03 net profit.
The total turnover for 1923 is \$595,598.11.

NEGRI SEMBILAN DAMAR ACCOUNT.

Dr.

TRADING AND PROFIT AND LOSS ACCOUNT FOR THE YEAR 1923.

Cr.

	Expenses in forest.		Expenses at receiving stations.		Expenses at central store.		Total.				
	\$	c.	\$	c.	\$	c.	\$	c.		\$	c.
To stock on hand and in transit on 1st January, 1923 ... ..	...	...	...	...	...	...	10,392	48	By sales completed during the year 1923 ...	87,532	50
„ payments to tappers	12,929	86	...	...	...	...	12,929	86	„ stock unsold	3,793	85
„ tools and plant	278	53	...	...	...	...	278	53			
„ carriage, portorage, and freight	35	25	...	...	1,370	24	1,405	49			
„ rent	326	50	144	00	456	32	926	82			
„ proportion of salaries of foresters and guards	5,520	00	1,980	00	504	00	8,004	00			
„ equipment ... ..	...	...	15	40	298	63	314	03			
„ packing, sorting, and grading ... ..	...	...	99	18	3,858	39	3,957	57			
„ bagging and despatching ... ..	...	...	546	77	1,828	68	2,375	45			
„ sundries	47	15	...	...	59	74	106	89			
	19,137	29	2,785	35	8,376	00	40,691	12			
Gross profit carried down ... ..	...	...	...	...	...	...	50,635	23			
							91,326	35		91,326	35
To proportion of office staff salaries, etc. ... ..	...	...	...	...	...	...	4,275	00	By gross profit brought down	50,635	23
„ agent's commission ... ..	...	...	...	...	...	...	2,404	88			
„ expenses at Singapore in connection with sales and despatch to Europe ... ..	...	...	...	...	...	...	962	79			
„ books and stationery ... ..	...	...	...	...	...	...	150	43			
„ insurance, stamp duty, etc. ... ..	...	...	...	...	...	...	832	01			
„ sundries ... ..	...	...	...	...	...	...	102	12			
							8,727	23			
„ net profit for year 1923 ... ..	...	...	...	...	...	...	41,908	00			
							50,635	23		50,635	23

I have examined the above Trading and Profit and Loss Account and certify the same to be correct.

H. B. POLGLASE,
Acting Auditor-General, F.M.S.,
6th June, 1924.

G. E. S. CUBITT,
Conservator of Forests, F.M.S. & S.S.

Form I.

AREA OF CONSTITUTED AND PROPOSED RESERVED FORESTS.

State and District.	Name of forest.	Constituted reserves.				Proposed reserves preliminarily notified but not constituted.	No. of notification and remarks.
		Area on 1-1-1923.	Added during year.	Excluded during year.	Area on 31-12-1923.		
		Acres.	Acres.	Acres.	Acres.	Acres.	
PERAK NORTH.							
Upper Perak	Padang Chong	8,898	...	...	8,898	...	
Do.	Lapang Ninering	14,900	...	...	14,900	...	
Do.	Papulut	...	36,000	...	36,000	...	2423 of 4-5-23
Do. and K. Kangsar	Piah	166,500	...	...	166,500	...	
Upper Perak, Selama, Larut, and K. Kangsar	Bintang Hijau	49,150	98,600	...	147,750	133,305	5077 of 24-8-23 and 5608 of 17-12-20
Selama	Ijok	11,661	...	...	11,661	...	
Selama, Larut and Krian	Pondok Tanjong	26,694	...	306	26,388	...	8082 of 30-11-23
Krian	Kurau Mangrove	5,274	...	...	5,274	...	
Do.	Semanggol	2,778	...	...	2,778	...	
Matang	Bukit Naga	2,530	...	...	2,530	...	
Krian and Matang	Matang Mangrove	98,097	...	...	98,097	...	
Larut	Assam Kumbang	31	...	...	31	...	
K. Kangsar and Larut	Larut Hills	27,370	...	78	27,292	1,283	8424 of 28-12-23 and 6543 of 19-10-23
K. Kangsar, Larut, and Matang	Bubu	96,000	...	174	95,826	...	4045 of 13-7-23. Includes 4,480 acres in Perak South
Kuala Kangsar	Chior	10,700	...	...	10,700	...	
Do.	Plus	13,600	...	...	13,600	...	
Do.	Kledang Saiong	80,200	6,157	...	86,357	...	6152 of 5-10-23. Includes 27,537 acres in Perak South
PERAK SOUTH.							
Kuala Kangsar	Bruas	16,355	...	...	16,355	...	
Do.	Parit	24,044	...	...	24,044	...	
Kinta	Tanjong Toh	8,870	...	...	8,870	...	
	Alang	...	...	...	...	...
K. Kangsar and Lower Perak	Raja Hitam	13,500	...	...	13,500	...	
Lower Perak	Pulau Tiga	395	...	...	395	...	
Do.	Changkat Jong	9,650	...	...	9,650	...	
Do.	Telok Bharu	1,356	...	...	1,356	...	
Do.	Rungkup	10,081	...	...	10,081	...	
Do.	Erong	15,500	...	...	15,500	...	
Lower Perak and Batang Padang	Kroh	10,400	...	5	10,395	31,000	2778 of 18-5-23 and 4427 of 28-7-22
Batang Padang...	Chikus	13,454	...	...	13,454	...	
Do.	Bikam	9,350	...	...	9,350	...	
Do.	Trolak	18,085	...	...	18,085	...	
Do.	Besut	4,865	...	...	4,865	48,000	1026 of 24-2-22
Do.	Behrang	5,241	131	...	5,372	...	Recomputation of area
	Total Perak...	775,529	140,888	563	915,854	213,588	
	Square miles ...	1,211.76	220.14	.88	1,431.02	333.73	
SELANGOR.							
Ulu Selangor	Bukit Kutu	15,770	...	...	15,770	...	
Do.	Kuang	2,508	...	740	1,768	...	4433 of 27-7-23
Do.	Kanching	1,180	...	...	1,180	...	
Do.	Bukit Belata	32,100	...	...	32,100	...	
Do.	Rantau Panjang	23,395	...	...	23,395	...	
Do.	Bukit Tarek	11,474	...	...	11,474	...	
Do.	Semangko	3,430	...	...	3,430	...	
Do.	Gading	13,375	...	...	13,375	...	
Do.	Batang Kali	22,700	...	...	22,700	...	
Ulu Selangor and Kuala Lumpur	Bukit Lagong	7,650	...	...	7,650	2,124	41 of 12-1-23 and 4046 of 13-7-23
Kuala Selangor...	Banjar	6,876	1,575	...	8,451	1,450	6992 of 2-11-23, 5770 of 21-9-23 and 1468 of 23-3-23
Do.	Bukit Badong	4,415	...	...	4,415	...	
Do.	K. Bernam	4,700	...	46	4,654	...	7387 of 16-11-23. In charge of D.C.Fts., Perak South
Do.	Panchang Pedena	...	...	...	4,000	...	6991 of 2-11-23
Kuala Selangor & Klang	Bukit Cheraka...	24,263	...	...	24,263	...	

Form I—(cont.)

AREA OF CONSTITUTED AND PROPOSED RESERVED FORESTS.—(cont.)

Civil district.	Name of forest.	Constituted reserves.				Proposed reserves preliminarily notified but not constituted.	No. of notification and remarks.
		Area on 1-1-1923.	Added during year.	Excluded during year.	Area on 31-12-1923.		
		Acres.	Acres.	Acres.	Acres.	Acres.	
SELANGOR—(cont.).							
Kuala Selangor and Klang	Kapar	13,852	272	...	14,124	550	4048 of 13-7-23 and 5371 of 8-9-22
Klang	Klang Islands ...	21,817	...	...	21,817	...	
Do.	Pulau Lumut ...	15,465	...	...	15,465	...	
Do.	Teluk Gedong ...	6,182	...	...	6,182	...	
Do.	Pulau Tengah ...	1,335	...	...	1,335	...	
Klang and K. Langat	Teluk	8,856	...	...	8,856	...	
Do.	Jugra	8,626	...	...	8,626	...	
Kuala Langat	Kelambu	8,620	...	...	8,620	45,800	3325 of 15-6-23
Do.	Sepang Kechil ...	...	1,382	...	1,382	...	4047 of 13-7-23. In charge of D.C.Fts., Negri Sembilan
Kuala Lumpur	Weld's Hill ...	43	...	...	43	...	
Do.	Sungai Buloh ...	16,205	...	...	16,205	...	
Do.	Circular Road ...	78	...	65	13	...	7385 and 7386 of 16-11-23
Do.	Ulu Gombak ...	43,093	...	...	43,093	6,014	1157 of 9-3-23
Do.	Ampang	7,273	...	...	7,273	...	
K. Lumpur & U. Langat	Bukit S. Puteh ...	4,594	...	...	4,594	...	
Ulu Langat	Gunong Itam ...	5,170	...	...	5,170	...	
Do.	Sungai Lallang ...	12,965	...	...	12,965	...	
Do.	Ayer Itam	11,239	...	...	11,239	...	
Do.	Bangi	2,214	...	...	2,214	...	
Do.	Bukit Tunggul ...	1,980	...	...	1,980	...	
Do.	Bukit Enggang ...	3,045	...	...	3,045	...	
Do.	Ulu Langat ... ..	...	...	...	...	41,000	5372 and 5374 of 8-9-22
	Total Selangor	366,488	3,229	851	368,866	100,938	
	Square miles ...	572.64	5.05	1.33	576.35	157.72	
NEGRI SEMBILAN.							
Jebebu	Triang	23,265	...	...	23,265	...	
Jebebu and Kuala Pilah	Pasoh	57,498	...	...	57,498	...	
Jebebu, Kuala Pilah, and Seremban	Berembun	52,650	...	...	52,650	...	
Kuala Pilah	Senaling-Inas ...	19,941	...	...	19,941	...	
Do.	Serting	3,908	...	...	3,908	...	
Do.	Kepis	6,791	...	...	6,791	...	
Do.	Bahau	19,610	...	...	19,610	...	
Do.	Jeram Padang N.	2,507	...	...	2,507	...	
Do.	" " S.	1,856	...	...	1,856	...	
Kuala Pilah, Seremban, and Tampin	Angsi ... ..	...	...	...	...	50,000	2303 of 21-7-16
Do.	Jelai-Gemas ...	24,117	...	128	23,989	...	1801 of 6-4-23
Do.	Palong ... ..	...	93,000	...	93,000	...	1158 of 9-3-23
Seremban	Senawang	1,864	...	...	1,864	...	
Do.	Lenggeng	4,347	...	...	4,347	...	
Do.	Labu	13,858	...	...	13,858	...	
Do.	Galla ... ..	...	...	...	...	12,200	2438 of 2-6-21
Do.	Bukit Tunggul (Extension)	..	...	...	...	1,700	6155 of 5-10-23
Tampin	Gunong Tampin	5,689	...	...	5,689	...	
Do.	Tebong	6,549	...	...	6,549	...	
Do.	South Gemas ...	17,170	...	...	17,170	...	
Do.	Pedas	16	...	...	16	...	
Coast	Sepang	1,651	...	...	1,651	...	
Do.	Sendayan	2,862	...	...	2,862	...	
Do.	Jimah	1,326	...	...	1,326	...	
Do.	Pasir Panjang ...	1,335	...	...	1,335	...	
Do.	" Puteh	55	...	...	55	...	
Do.	Port Dickson ...	12	...	...	12	...	
Do.	Menyala	5,723	...	...	5,723	...	
Do.	Lukut ... ..	...	1,959	...	1,959	...	5771 of 21-9-23
	Total N.S. ...	274,600	94,959	128	369,431	63,900	
	Square miles ...	429.06	148.37	.2	577.24	99.84	

Form I—(cont.)

AREA OF CONSTITUTED AND PROPOSED RESERVED FORESTS.—(cont.)

Civil district.	Name of forest.	Constituted reserves.				Proposed reserves preliminarily notified but not constituted.	No. of notification and remarks.
		Area on 1-1-1923.	Added during year.	Excluded during year.	Area on 31-12-1923.		
		Acres.	Acres.	Acres.	Acres.	Acres.	
PAHANG WEST.							
Lipis	Jelai	6,800	...	310	6,490	...	3089 of 1-6-23
Do.	Kechau	10,000	...	3,862	6,138	...	Survey correction
Do.	Yong	97,000	...	...	97,000	...	
Do.	Benchah	11,330	...	...	11,330	...	
Do.	Som	32,750	...	...	32,750	...	
Do.	Mangsok	671	...	...	671	...	
Do.	Putat	2,040	...	32	2,008	...	Survey correction
Do.	Tekau	120,000	...	...	120,000	...	
Do.	Tekai ... ..	...	...	...	...	83,000	2779 of 18-5-23
Lipis and Raub	Tersang ... ..	...	...	...	...	75,000	1027 of 24-2-22
Raub	Ulu Dong	2,814	...	...	2,814	...	
Do.	Jahit	768	...	...	768	...	
Do.	Rotan Tunggal	1,724	...	...	1,724	...	
Do.	Bukit Kajang ...	...	...	...	...	8,600	7632 of 15-12-22
Raub and Bentong	Kelau	69,466	...	...	69,466	...	
Bentong	Benus Telemong	...	...	...	...	117,000	(2723 of 2-7-20 4049 of 13-7-23
Bentong and Temerloh	Kemasul	111,593	9,464	...	121,057	...	7633 of 15-12-22
Temerloh	Jinka ... ..	...	...	...	...	125,000	1292 of 10-5-18
Raub and Temerloh	Lakum	72,000	...	...	72,000	...	
Temerloh	Kerdau	15,060	...	...	15,000	...	
Do.	Krau	8,236	...	1,279	6,957	...	Survey correction
PAHANG EAST.							
Kuantan	Baloh	28,894	...	...	28,894	...	
Do.	Bukit Goh	20,939	...	...	20,939	...	
Do.	Kuantan	1,424	...	...	1,424	...	
Do.	Berkelah	15,500	...	...	15,500	...	
Pekan	Lepar	64,200	...	3,694	60,506	...	Survey correction
Do.	Chini	29,800	...	...	29,800	...	
Do.	Aur	35,000	88,500	...	123,500	...	6153 of 5-10-23
Do.	Lesong	158,700	170,000	...	328,700	...	6154 of 5-10-23
Do.	Mentas	1,435	...	...	1,435	...	
Do.	Perah	503	...	...	503	...	
Do.	Menchali	1,522	...	...	1,522	...	
Do.	Rompin Mangrove	393	...	...	393	...	
Do.	Pulau Lang	59	...	...	59	...	
Do.	Pontian Mangrove	...	470	...	470	...	3088 of 1-6-23
Total Pahang ...		920,561	268,434	9,177	1,179,818	408,600	
Square miles ...		1,438.38	419.43	14.34	1,843.47	638.44	
SUMMARY.							
Perak ... ..	...	775,529	140,888	563	915,854	213,588	
Selangor ... ..	...	366,488	3,229	851	368,866	100,938	
N. Sembilan ... ..	...	274,600	94,959	128	369,431	63,900	
Pahang ... ..	...	920,561	268,434	9,177	1,179,818	408,600	
Total ...		2,337,178	507,510	10,719	2,833,969	787,026	
Square miles ...		3,651.84	496,791 792.98 | 16.75		4,428.08	1,229.73	
Total 1922 ...		2,256,882	776.24 80,967 | 671		2,337,178	838,118	
Square miles ...		3,526.38	80,296 126.51 | 1.05		3,651.84	1,309.56	
			125.46				

RECORD OF DEMARCATION AND MAINTENANCE OF BOUNDARIES FOR 1923.

31

a. Excludes \$108 cost of 36 boundary plates bought in previous years.
b. " 39 " 13 " " "
c. Including Kuala Bernam Reserve in Selangor. " "
d. Excludes \$18 cost of 6 boundary plates bought in previous years.

e. Excluding Kuala Bernam and Sepang Kechil Reserves in charge of the D. C. Forests, Perak South and Negri Sembilan respectively.
f. Including Sepang Kechil Reserve in Selangor.
g. Excludes \$107 cost of 43 boundary plates bought in previous years.

Form III.

STATEMENT OF SURVEYS DURING THE YEAR 1923.

Locality and nature of survey.	By Survey Department.				By Forest Department.				Remarks.
	Acres.	Miles.	Chains.	Expenditure.	Acres.	Miles.	Chains.	Expenditure.	
				\$				\$	
PERAK NORTH.									
Bintang Hijau Reserve—									
Damar tapping areas	13	19	83	Paid from Vote I (f)
Kledang Saiong—									
Firewood areas boundary	1	...	...	By Forest Staff
State land—									
Timber licencees' areas	9	...	...	At Licencees' expense
Matang Reserve—									
Coupe boundaries	11	58	...	By Forest Staff
Alteration of boundary	14	44	67	Includes cost of demarcation and was charged to VI (a)
Total	49	41	150	
PERAK SOUTH.									
Stock maps of <i>taban</i> , Trolak Reserve	3	03	12	
Boundary surveys, Behrang Reserve	14	60	890	...				
Access road, Bikam Reserve	2	47	178	...				
Total	17	27	1,068	...	3	03	12	

Apparent errors in this form are due to the elimination of cents.

STATEMENT OF SURVEYS DURING THE YEAR 1923.—(cont.)

Locality and nature of survey.	By Survey Department.				By Forest Department.				Remarks.
	Acres.	Miles.	Chains.	Expenditure.	Acres.	Miles.	Chains.	Expenditure.	
				£				£	
SELANGOR.									
Boundary surveys—									
Ulu Gombak Reserve ...	...	...	...	...	...	16			
Bukit Lagong Reserve...	...	...	...	...	...	3	40		
Kelambu Reserve ...	...	...	...	...	...	59	5		
Kapar Reserve ...	...	...	...	...	...	1	42		
Cheraka Reserve ...	...	...	...	...	...	1	76		
Coupe boundaries—									
Klang Mangrove Reserve ...	...	...	...	...	...	2	49		
Banjar Reserve...	...	...	...	...	...	1			
Rantau Panjang Reserve ...	...	...	...	...	...		40	7	
Sungai Chok estate road ...	...	...	...	...	...	1	37	2	
Total ...	...	...	...	...	...	87	49	9	
NEGRI SEMBILAN.									
Boundary surveys—									
Berembun Reserve ...	...	...	...	466	...	...	...	...	Office work
Bukit Galla Reserve ...	...	...	75	495	...	...	77	18*	Alteration in boundaries
Palong Reserve...	...	57	...	5,607	...	24	...	688*	
Jelai-Gemas Reserve ...	...	...	...	11	...	...	...	...	Office work
Lukut Reserve ...	...	...	...	161	...	...	...	...	"
Pasoh Reserve, access roads	...	...	...	201	...	...	...	...	"
Sakai settlement, Gunong Tampin	...	...	...	...	46 $\frac{3}{4}$	1	01	6	
New paths in Tebong Reserve ...	...	...	...	...	...	5	33	27	
Total ...	...	57	75	6,941	46 $\frac{3}{4}$	31	31	740	Items marked * include cost of demarcation and were charged to VI (a)
PAHANG WEST.									
Boundary surveys—									
Jelai Reserve ...	6,490	24	40	1,227	...	...	...	...
Kechau Reserve ...	6,138				...	...	...	...
Krau Reserve ...	6,957	24	49	1,597	...	...	...	...
Kerdau Reserve ...	...	3	63	380	...	...	...	...
Kemasul Reserve ...	...	99	22	5,960	...	...	...	...
Total ...	19,585	152	14	9,163	...	...	...	...
GRAND TOTAL ...	19,585	227	36	17,172	46 $\frac{3}{4}$	171	44	911	

Apparent errors in this form are due to the elimination of cents.

COMMUNICATIONS AND BUILDINGS, 1923.

NEW WORK UNDERTAKEN DURING THE YEAR.						ALTERATIONS AND REPAIRS EXECUTED DURING THE YEAR.							
Roads and Bridges.			Buildings.		Other works.		Roads and Bridges.			Buildings.		Other works.	
Description of road or path.	Miles.	Cost.	Description of building.	Cost.	Description of work.	Cost.	Description of road and nature of repairs.	Miles.	Cost.	Description of building and nature of repairs.	Cost.	Description of work and nature of repairs.	Cost.
		£		£		£			£		£		£
PERAK.													
Inspection paths— Behrang Reserve	1½	88	Temporary quarters in Mangrove	50	Asamkumbang quarters—		General repairs— Perak (N) ...	28	262	General repairs— Perak (N) ...	1,846	Maintenance of compounds—	
Trolak Reserve	3½	248	Bath house at Manong	45	Cement drain ...	85	" (S) ...	86	298	" (S) ...	2,390	Perak (N) ...	187
			Damar Store— Sumpitan ...	700	Fencing, Semat ...	30	By P.W.D. Remetalling approach roads—			By P.W.D. General repairs ...	594	" (S) ...	76
			Damar Kongsis— Sumpitan ...	150			Asamkumbang		126			Caretakers ...	216
			Chior Reserve ...	10			Sungai Siput ...		70			Repairs to well ...	30
			Latrines— Tambun } Menglembu } Siputeh ... }	227								Miscellaneous ...	4
												By P.W.D. Kota Checking Station, sheeting and piling	85
Total ...	4½	337	Total ...	1,182	Total ...	115	Total ...	114	756	Total ...	4,830	Total ...	608
SELANGOR.													
Sungai Buloh— Bridge ...		810	Temporary quarters— Sungai Buloh ...	35			General repairs ...	102	398	General repairs ...	1,979	Caretaker— Rantau Panjang ...	239
Road ...	½	2,286	Ayer Itam ...	75			Sedgeley Estate— Road ...	½	581	By P.W.D. General repairs ...	928	General repairs ...	2
			Kanching ...	570			Bridge ...		100	Colour washing & general repairs— C.F.'s Office ...	1,015	By P.W.D. General repairs ...	119
			By P.W.D. Addition to office of D.C.F.	1,900						D.C.F.'s Office ...	1,812		
										Timber Branch	550		
Total ...	½	3,096	Total ...	2,550	Total ...	...	Total ...	102½	1,079	Total ...	6,284	Total ...	360
NEGRI SEMBILAN.													
			Temporary quarters for subordinates and motor shed, Selaru	189			General repairs ...	124½	392	By P.W.D. General repairs ...	789	Maintenance of compounds	477
			By P.W.D. Subordinates' quarters— Tebong ...	1,144								Repairs to well ...	10
			Kepis ...	450								Miscellaneous ...	9
			Sendayan ...	1,365									
Total ...			Total ...	3,148	Total ...	...	Total ...	124½	392	Total ...	789	Total ...	495

COMMUNICATIONS AND BUILDINGS, 1923—(cont.)

NEW WORK UNDERTAKEN DURING THE YEAR.							ALTERATIONS AND REPAIRS EXECUTED DURING THE YEAR.						
Roads and Bridges.			Buildings.		Other works.		Roads and Bridges.			Buildings.		Other works.	
Description of road or path.	Miles.	Cost.	Description of buildings.	Cost.	Description of work.	Cost.	Description of road and nature of repairs.	Miles.	Cost.	Description of building and nature of repairs.	Cost.	Description of work and nature of repairs.	Cost.
		₹		₹		₹			₹		₹		₹

PAHANG.

			Office, Mentakab	1,000	Wells—		General repairs—			General repairs—		Caretaker's wages	108
			Addition to guards' quarters, Bentong	175	Tembeling ...	10	Pahang (W) ...	17	70	Pahang (W) ...	1,493	Maintenance of compounds	34
			Guards' quarters, Kuala Klau (incomplete)	300	Jerantut ...	18	" (E) ...	34½	113	" (E) ...	713	Floating latrines	22
			Checking stations—										
			Tanjong Pasir	800									
			Pekan ...	750									
			By P.W.D.										
			Quarters for Ranger & Guard, Mentakab	3,345									
Total ...	...	...	Total ...	6,370	Total ...	28	Total ...	51½	183	Total ...	2,206	Total ...	164

SUMMARY.

PERAK ...	4½	337	...	1,182	...	115	...	114	756	...	4,830	...	608
SELANGOR ...	½	3,096	...	2,580	...	...	...	102½	1,079	...	6,284	...	360
NEGRI SEMBILAN ...	...	...	...	3,148	...	...	...	124½	392	...	789	...	495
PAHANG ...	...	...	...	6,370	...	28	...	51½	183	...	2,206	...	164
Total ...	5½	3,433	Total ...	13,281	Total ...	143	Total ...	392½	2,410	Total ...	14,109	Total ...	1,628
				\$16,856						\$18,147			

Total spent by Forest Department ... \$20,711

" Public Works Department ... 14,233

Grand Total ... \$35,003

Apparent errors in this form are due to the elimination of cents.

SUMMARY OF FOREST OFFENCES FOR THE YEAR 1923.

State.	Pending from previous months.		New Cases.						Grand total of pending and new cases.	Cases disposed of														Confiscated property sold or released (sections 44 and 47).		Compensation for damage to trees or timber (section 45).		Still pending.		
			Unauthorized felling, removal, or appropriation of Forest Produce.				Other offences.			Total.				Convictions.						Acquitted or discharged (without caution).		Total.								
														Imprisonment with out option of fine.		Fined or compounded.		Cautioned and discharged.												Total.
	Cases.	Persons.	Cases.	Persons.	Cases.	Persons.	Cases.	Persons.	Cases.	Persons.	Cases.	Persons.	Cases.	Persons.	%	Cases.	Persons.	Cases.	Persons.	Cases.	Persons.	Cases.	Persons.	Cases.	%	Cases.	%	Cases.	Persons.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
Perak (North)	{ A ... B ... C	...	...	58	82	...	...	58	82	58	82	...	...	52	72	1,081	5	6	57	78	1	4	58	82	45	99	1	5	...	...
		...	...	114	159	...	...	114	159	114	159	...	...	102	145	896 <i>a</i>	7	8	109	153	2	3	111	156	62	730	...	...	3	3
		...	...	22	68	...	...	22	68	22	68	...	...	...	...	...	...	...	...	...	...	...	22	68	13	106	...	...	...	...
	Total	...	...	194	309	...	...	194	309	194	309	...	...	154	217	1,977	12	14	166	231	3	7	191	306	120	935 <i>b</i>	1	5	3	3
Perak (South)	{ A ... B ... C	...	...	50	75	5	12	55	87	55	87	2	2	49	62	983	2	2	53	66	2	21	55	87	45	2,799	1	320	...	...
		...	...	129	171	...	...	129	171	129	171	...	...	129	171	2,080 <i>c</i>	...	...	129	171	...	...	129	171	67	3,094	...	...	...	...
		...	...	27	30	...	...	27	30	27	30	...	...	...	...	...	...	...	...	...	...	...	27	30	26	147	...	...	...	...
	Total	...	...	206	276	5	12	211	288	211	288	2	2	178	233	3,063	2	2	182	237	2	21	211	288	138	6,041 <i>d</i>	1	320	...	...
Selangor	{ A ... B ... C	2	2	31	46	4	6	35	52	37	54	...	...	36	52	3,253	...	...	36	52	1	2	37	54	21	80	3	175	...	...
		4	8	219	373	1	2	220	375	224	383	...	...	218	375	2,342 <i>e</i>	1	1	219	376	...	...	219	376	21	208	3	60	5	7
		...	...	16	27	...	...	16	27	16	27	...	...	...	...	...	...	...	...	...	...	...	16	27	4	46	...	...	...	...
	Total	...	6	10	266	446	5	8	271	454	277	464	254	427	5,595	1	1	255	428	1	2	272	457	46	333 <i>f</i>	6	235	5	7
Negri Sembilan	{ A ... B ... C	...	...	8	12	...	...	8	12	8	12	...	...	8	12	1,425	...	...	8	12	...	...	8	12	1	10	...	...	...	...
		...	...	48	52	1	1	49	53	49	53	...	...	48	52	565	...	...	48	52	...	...	48	52	21	1,523	...	...	...	...
		...	...	2	2	...	...	2	2	2	2	...	...	...	...	...	...	...	...	...	...	...	2	2	1	11	...	...	...	...
	Total	...	...	58	66	1	1	59	67	59	67	...	...	56	64	1,990	...	...	56	64	...	...	58	66	23	1,544 <i>g</i>	...	...	...	...
Pahang (West)	{ A ... B ... C	...	...	32	53	...	...	32	53	32	53	...	...	21	23	246	6	24	27	47	5	6	32	53	13	48	3	38	...	...
		7	7	41	45	...	...	41	45	48	52	...	...	42	46	577	1	1	43	47	2	2	45	49	1	1	...	...	3	3
	
	Total	...	7	7	73	98	73	98	80	105	63	69	823	7	25	70	94	7	8	77	102	14	49	3	38	3	3
Pahang (East)	{ A ... B ... C	...	...	9	10	...	...	9	10	9	10	...	...	6	7	1,345	...	...	6	7	3	3	9	10	2	513	...	...	...	...
		...	...	45	51	...	...	45	51	45	51	...	...	45	51	404	...	...	45	51	...	...	45	51	17	177	...	...	...	...
		...	...	2	2	...	...	2	2	2	2	...	...	...	...	...	...	...	...	...	...	...	2	2	...	...	...	...	...	...
	Total	...	...	56	63	...	...	56	63	56	63	...	...	51	58	1,749	...	...	51	58	3	3	56	63	19	690	...	...	...	...
Total for F.M.S.	{ A ... B ... C	2	2	188	278	9	18	197	296	199	298	2	2	172	228	8,333	13	32	187	262	12	36	199	298	127	3,549	8	538	...	...
		11	15	596	851	2	3	598	854	609	869	...	...	584	840	6,865	9	10	593	850	4	5	597	855	189	5,733	3	60	11	13
		...	...	69	129	...	...	69	129	69	129	...	...	...	...	...	...	...	...	...	...	...	69	129	44	311	...	...	...	...
Grand Total	...	13	17	853	1258	11	21	864	1279	877	1296	2	2	756	1068	15,198	22	42	780	1112	16	41	865	1282	360	9,593	11	598	11	13

NOTE.—In column 1
 A = Cases taken into Court.
 B = Cases dealt with departmentally.
 C = Undetected cases.

(a) Excludes \$1,226 branch of agreement. (b) Includes \$25 sale of implements, credited to I.V.C. (c) Excludes \$1,565 branch of agreement. (d) Includes \$1 sale of implements, credited to I.V.C. and excludes \$2 sale of unclaimed government property. (e) Excludes \$2,275 branch of agreement. (f) Includes \$45 sale of implements, credited to I.V.C. and excludes \$133 sale of unclaimed timber. (g) Excludes \$35 sale of unclaimed timber. Apparent errors in this form are due to the elimination of cents.

Form F-11.
WORKS OF REPRODUCTION AND IMPROVEMENT.

Reserve.	Kind of plantation or nature of work done.	Area in acres.					Receipts.	Charges.		Remarks.
		On 1-1-23.	Added during year.	Excluded.	Retreated.	On 31-12-23.		Creation.	Upkeep.	
1	2	3	4	5	6	7	\$	\$	\$	11

Perak—

I.—REGULAR PLANTATIONS.

Matang	Mangrove	611	35	...	...	646	...	195	...	VI _e
Kuala Krau	"	5	...	...	...	5	...	...	...
Asam Kumbang	Para rubber	31	...	...	31	31	35	...	208	VI _g
Pondok Tanjong	Rotan	5	...	...	5	5	...	...	14	VI _e
"	Kepayang	$\frac{1}{2}$	...	...	...	$\frac{1}{2}$	...	...	...
Total ...		652 $\frac{1}{2}$	35	...	36	687 $\frac{1}{2}$	35	195	222	
Selangor—										
Circular Road	Various species	24	...	11	13	13	...	...	713	
Weld Hill Reservoir	Para rubber	6	...	...	...	6	...	...	...
Sungei Buloh	Batai, yemane, chengal, and merbau	10	...	...	...	10	...	...	...
Ulu Gombak	Yemane	$\frac{1}{2}$	...	...	...	$\frac{1}{2}$	...	...	...
Klang Mangrove	Mangrove	108	238	...	...	346	...	2	...	By subordinates
Kuang	Para rubber and cocoanuts	2	...	...	...	2	...	...	...
Kapar	Malabera ... ..	...	2	...	...	2	...	6	...	"
Total ...		150 $\frac{1}{2}$	240	11	13	379 $\frac{1}{2}$	...	8	713	VI _e
Total F.M.S. ...		803	275	11	49	1,067	35	203	935	

II.—CULTURAL OPERATIONS.

(Planting and sowing in shade in the forests.)

Perak—

Pondok Tanjong	Chengal, merbau, kulim, and kamuning	537	...	...	...	537	...	...	...
"	Rotan	203	...	...	...	203	...	...	...
Parit	Broadcasting meranti	3	...	...	...	3	...	...	...
Tanjong Toh Alang	Chengal	2	...	...	...	2	...	...	...
Bikam	"	1,067	...	...	...	1,067	...	...	...
"	Merbau	30	...	...	...	30	...	...	...
Trolak	Taban	238	...	...	34	238	...	...	49	
"	" (nursery)	$\frac{1}{2}$	$1\frac{1}{2}$	...	...	2	...	852	...	
Behrang	" "	2	2	...	...	4	...	861	...	
Total ...		2,082 $\frac{1}{2}$	3 $\frac{1}{2}$	...	34	2,086	...	1,713	49	VI _e

Form VII—(cont.)

WORKS OF REPRODUCTION AND IMPROVEMENT—(cont.)

Reserve.	Kind of plantation or nature of work done.	Area in acres.					Receipts.	Charges.		Remarks.
		On 1-1-23.	Added during year.	Excluded.	Retreated.	On 31-12-23		Creation.	Upkeep.	
1	2	3	4	5	6	7	8	9	10	11

II.—CULTURAL OPERATIONS.—(cont.)

(Planting and sowing in shade in the forests.)—(cont.)

Selangor—										
Rantau Panjang ...	Taban ...	...	1,379 $\frac{1}{2}$	...	...	7	1,379 $\frac{1}{2}$	...	...	15
" " ...	" (nursery) ...	...	...	...	...	...	...	90	...	...
Kar ch'ng ...	Camphor ...	...	34	100	100	...	34	...	295	...
" ...	" (sowing) ...	...	333	...	333	...	...	...	...	...
Total ...		...	1,746 $\frac{1}{2}$	100	433	7	1,413 $\frac{1}{2}$	...	385	15 VIe
Negri Sembilan—										
Senawang ...	Penak, merbau and taban ...	...	415 $\frac{1}{2}$	...	...	84	415 $\frac{1}{2}$	...	...	300
Senaling-Inas ...	Penak, merbau, tembusu, penaga and gelam ...	...	228	...	...	...	228	...	...	...
Serting ...	Penak, merbau, and tembusu ...	...	29	...	...	...	29	...	...	...
Kepis ...	" " " " ...	...	263	...	...	...	263	...	...	...
Pasir Panjang ...	Damar laut " ...	...	86	...	...	...	86	...	...	...
Total ...		...	1,021 $\frac{1}{2}$	...	...	84	1,021 $\frac{1}{2}$	...	...	300 VIe
Pahang—										
Bilut ...	Chengal and kulim ...	...	65	...	...	...	65	...	...	...
Baloh ...	Chengal ...	...	47	...	...	...	47	...	...	...
Bukit Goh ...	" ...	...	7	...	...	...	7	...	...	...
" ...	Rotan sega ...	...	15	...	...	...	15	...	...	...
Kuantan ...	Mangrove ...	...	$\frac{1}{4}$	...	...	...	$\frac{1}{4}$	...	...	...
Pulau Lang ...	" ...	...	2	...	...	...	2	...	...	...
Total ...		...	136 $\frac{1}{4}$	...	...	...	136 $\frac{1}{4}$	...	...	...
Total F.M.S. ...		...	4,986 $\frac{3}{4}$	103 $\frac{1}{2}$	433	125	4,657 $\frac{1}{4}$	...	2,098	365

WORKS OF REPRODUCTION AND IMPROVEMENT—(cont.)

Reserve.	Kind of plantation or nature of work done.	Area in acres.					Receipts.	Charges.		Remarks.
		On 1-1-23.	Added during year.	Excluded.	Retreated.	On 31-12-23.		Creation.	Upkeep.	
1	2	3	4	5	6	7	8	9	10	11
III.—WORKS OF IMPROVEMENT.										
Perak—										
Pondok Tanjong ...	Improvement fellings ...	2,612	...	...	...	2,612	...	...	...
" ...	Clearing round chengal trees ...	...	...	...	...	...	...	181	...	
Larut Hills ...	Improvement fellings ...	70	...	...	70	70	...	...	47	
Ijok ...	Clearing round chengal in damar areas ...	...	...	...	...	...	...	994	...	
Parit ...	Improvement fellings ...	1,621	...	...	621	1,621	...	...	1,635	
Tanjong Toh Alang ...	" " ...	245	...	...	...	245	...	...	...
Trolak ...	" " ...	4,861	...	...	280	4,861	...	...	1,272	
Behrang ...	" " ...	2,191	...	...	542	2,191	...	...	2,282	
Chikus ...	" " ...	215	...	...	...	215	...	...	...
Bikam ...	" " ...	2,728	...	...	...	2,728	...	...	...
Besout ...	" " ...	1,202	...	...	...	1,202	...	...	...
	Total ...	15,745	...	...	1,513	15,745	...	1,175	5,236	VI f
Selangor—										
Rantau Panjang ...	Improvement fellings ...	3,000	...	...	10	3,000	...	...	48	VI f
" ...	Cleaning ...	...	64	...	...	64	...	385*	...	VI f
Kuang ...	Improvement fellings ...	1,534	...	...	...	1,534	...	...	...
Kanching ...	" " ...	1,180	...	...	...	1,180	...	...	...
" ...	Cleaning ...	...	...	...	100	...	...	75*	...	VI f
Bangi ...	Improvement fellings ...	2,214	...	...	...	2,214	...	...	...
" ...	Cleaning ...	...	...	...	575	...	...	922*	...	VI f
Sungai Lalang ...	Improvement fellings ...	1,938	...	...	106	1,938	...	...	233	VI f
Bukit Tunggul ...	" " ...	1,794	...	...	...	1,794	...	...	...
" ...	Cleaning sample plot 17 ...	...	...	...	72	...	...	...	97	VIII a
Ayer Itam ...	Bertam cutting ...	924	...	...	...	924	...	...	...
Sungai Buloh ...	Improvement fellings ...	2,353	...	...	98½	2,353	...	657*	...	VI f
Ulu Gombak ...	Bertam cutting ...	809	...	...	...	809	...	...	...
Weld's Hill ...	General upkeep ...	39	...	...	39	39	...	...	823	VI f
Bukit Puteh ...	Improvement fellings ...	16	...	...	...	16	...	...	...
Bukit Cheraka ...	" " ...	1,443	...	...	...	1,443	...	...	...
	Total ...	17,244	64	...	1,000½	17,308	...	2,039	1,201	

* Items marked are for new works in old areas.

WORKS OF REPRODUCTION AND IMPROVEMENT—(cont.)

Reserve.	Kind of plantation or nature of work done.	Area in acres.					Receipts. \$	Charges.		Remarks.
		On 1-1-23.	Added during year.	Excluded.	Retreated.	On 31-12-23.		Creation \$	Upkeep. \$	
1	2	3	4	5	6	7	8	9	10	11
III.—WORKS OF IMPROVEMENT.—(cont.)										
Negri Sembilan—										
Senawang	Improvement clearings	1,737 $\frac{1}{2}$	...	...	89	1,737 $\frac{1}{2}$	...	...	333	
Labu	" " " " " "	45	...	...	...	45	...	...	...
Kepis	" " and fellings	1,180	...	...	...	1,180	...	...	...
Gemas	" " " " " "	135 $\frac{3}{4}$	...	...	...	135 $\frac{3}{4}$	...	...	...
Sendayan	" " and fellings	990 $\frac{3}{4}$	...	...	...	990 $\frac{3}{4}$	...	...	...
Senaling-Inas	" " " " " "	1,655	...	...	465	1,655	...	...	1,469	
Serting	" " " " " "	1,169	...	...	200	1,169	...	...	520	
Pasoh	" " " " " "	1,674	...	...	436	1,674	...	...	1,093	
Bahau	" " " " " "	9 $\frac{1}{2}$	...	...	...	9 $\frac{1}{2}$	...	...	...
Pasir Panjang	" " " " " "	57	...	...	...	57	...	...	...
P. Dickson (1st mile)	" " " " " "	10	...	...	...	10	...	...	...
Triang	" " and fellings	23	...	...	...	23	...	...	...
	Total ...	8,686 $\frac{1}{2}$	...	...	1,190	8,686 $\frac{1}{2}$	...	...	3,415	VI f
Pahang—										
Benchah	Improvement fellings in favour of taban	1,756	...	...	400	1,756	...	...	1,287	
Ulu Dong	" " " " " "	2,079	...	...	...	2,079	...	...	...
Putat	" " " " " "	2,040	...	32	320	2,008	...	...	1,107	Survey correction.
Mangsok	" " " " " "	671	...	...	221	671	...	...	845	
Jahit	" " " " " "	...	768	...	...	768	...	247	...	
Rotan Tunggal	Improvement fellings in favour of Class I trees	1,115	...	...	...	1,115	...	...	...
Bilut	" " " " " "	1,275	...	...	...	1,275	...	...	...
Menchali	Improvement fellings	769	...	...	...	769	...	...	...
Lesong	" " " " " "	960	...	...	...	960	...	...	...
Perah	" " " " " "	503	...	...	...	503	...	...	...
Mentas	Bertam cutting	200	...	...	...	200	...	...	...
Bukit Goh	Improvement fellings	1,421	...	...	74	1,421	...	...	42	
Baloh	" " " " " "	1,067	...	...	...	1,067	...	...	...
	Total ...	13,856	768	32	1,015	14,592	...	247	3,281	VI f
	Total F.M.S. ...	55,531 $\frac{1}{2}$	832	32	4,718 $\frac{1}{2}$	56,331 $\frac{1}{2}$	...	3,461	13,133	
SUMMARY.										
All States ...	Regular plantations	803	275	11	49	1,067	35	203	935	
	Cultural operations	4,986 $\frac{3}{4}$	103 $\frac{1}{2}$	433	125	4,657 $\frac{1}{4}$	...	2,098	365	
	Works of improvement	55,531 $\frac{1}{2}$	832	32	4,718 $\frac{1}{2}$	56,331 $\frac{1}{2}$	...	3,461	13,133	
	GRAND TOTAL ...	61,321 $\frac{1}{4}$	1,210 $\frac{1}{2}$	476	4,892 $\frac{1}{2}$	62,055 $\frac{3}{4}$	35	5,762	14,432	

Form F.C.C.
OUTTURN OF TIMBER AND FUEL FOR 1923.

State and District.			By Government and Purchasers.						By Free Grantees.					Grand Total.		
			Class IA.	Class IB.	Class IC.	Class II.	Poles.	Fuel.	Charcoal.	Total.	Timber.	Poles.	Fuel.		Charcoal.	Total.
			Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.		Tons.	Tons.
RESERVED FORESTS.																
Perak (North) ...	...	1	1	...	1	1,039	153,652	...	154,694	6	71	300	...	377	155,071
Perak (South) ...	...	452	40	885	96	4,292	26,853	5	32,624	...	...	...	...	...	32,624
Selangor ...	...	41	98	1,128	292	3,859	88,671	...	94,089	...	...	...	...	...	94,089
Negri Sembilan ...	...	6	1	23	6	169	551	...	756	...	...	...	...	...	756
Pahang (West) ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Pahang (East) ...	...	21	30	72	...	...	423	...	547	...	...	...	...	...	547
Total 1923 ...	...	521	170	2,109	395	9,359	270,150	5	282,710	6	71	300	...	377	283,087
" 1922 ...	...	285	153	485	124	7,242	232,637	...	240,926	...	160	183	...	343	241,269
" 1921 ...	...	646	1,630	650	178	11,832	262,933	...	277,869	34	430	210	...	674	278,544
" 1920 ...	...	1,009	5,657	886	396	15,877	337,765	...	361,590	51	3,786	342	...	4,179	365,769
" 1919 ...	...	640	3,393	991	278	13,950	345,548	...	364,800	...	236	...	...	236	365,036
" 1918 ...	...	488	282	1,223	97	10,068	285,787	2	297,947	71	408	223	...	702	298,649
" 1917 ...	...	144	103	1,710	124	11,253	188,958	5	202,397	303	522	10	...	835	203,132
" 1916 ...	...	105	57	39	20	7,657	149,252	...	157,130	124	888	...	...	1,012	158,142
" 1915 ...	...	166	146	257	53	9,165	114,243	...	124,030	...	...	...	...	278	124,308
UNRESERVED FORESTS.																
Perak (North) ...	...	4,614	2,322	9,159	437	4,217	29,842	3,549	54,140	...	...	10,000	...	10,000	64,140
Perak (South) ...	...	3,707	2,246	16,031	950	16,281	162,351	4,980	206,546	...	...	...	...	...	206,546
Selangor ...	...	1,431	240	5,713	137	5,208	32,820	7,614	53,162	473	85	1,191	...	1,749	54,911
Negri Sembilan ...	...	4,655	1,360	2,780	56	1,215	17,367	881	28,314	...	...	48,978	...	48,978	77,292
Pahang (West) ...	...	4,593	32	1,256	11	795	6,139	345	13,170	...	...	...	...	...	13,170
Pahang (East) ...	...	1,803	5,651	833	15	595	3,496	166	12,559	...	...	...	...	...	12,559
Total 1923 ...	...	20,802	11,851	35,772	1,605	28,311	252,015	17,535	367,891	473	85	60,169	...	60,727	428,618
" 1922 ...	...	21,540	12,827	37,028	1,444	26,348	264,696	17,729	381,613	291	99	103,954	...	104,343	485,956
" 1921 ...	...	45,252	20,467	45,340	1,846	30,650	288,722	16,587	448,865	1,504	2,916	72,031	...	76,451	525,315
" 1920 ...	...	30,547	19,178	66,640	2,983	45,744	414,816	20,353	600,261	1,537	3,638	37,347	...	42,522	642,783
" 1919 ...	...	30,392	20,342	50,393	3,615	48,911	417,359	20,148	591,161	1,294	5,103	31,293	...	37,690	628,850
" 1918 ...	...	30,773	15,700	57,387	4,278	60,676	430,193	18,026	617,033	7,028	5,663	39,953	...	52,644	669,677
" 1917 ...	...	28,843	10,315	57,108	3,447	42,420	350,062	19,048	511,243	6,687	3,813	46,178	...	56,678	567,921
" 1916 ...	...	21,470	10,944	51,880	2,972	38,240	498,718	16,327	640,551	7,846	11,276	124,200	235	143,557	784,108
" 1915 ...	...	10,403	19,227	41,659	3,636	41,184	409,409	13,586	539,104	...	...	...	...	132,178	671,282
TOTAL FOR RESERVED AND UNRESERVED FORESTS.																
1923 ...	...	21,324	12,022	37,881	2,000	37,670	522,165	17,540	650,601	479	156	60,469	...	61,104	711,705
1922 ...	...	21,825	12,980	37,514	1,568	33,590	497,333	17,729	622,539	291	259	104,137	...	104,686	727,225
1921 ...	...	45,898	22,097	45,990	2,024	42,482	551,655	16,587	726,734	1,538	3,346	72,241	...	77,125	803,859
1920 ...	...	31,556	24,835	67,526	3,379	61,621	752,581	20,353	961,851	1,588	7,424	37,689	...	46,701	1,008,552
1919 ...	...	31,032	23,735	51,384	3,893	62,861	762,907	20,148	955,960	1,294	5,339	31,293	...	37,926	993,886
1918 ...	...	31,261	15,982	58,610	4,375	70,744	715,980	18,028	914,980	7,099	6,071	40,176	...	53,346	968,326
1917 ...	...	28,987	10,418	58,818	3,571	53,673	539,020	19,053	713,540	6,990	4,335	46,188	...	57,513	771,053
1916 ...	...	21,575	11,001	51,919	2,992	45,897	647,970	16,327	797,681	7,970	12,164	124,200	235	144,569	942,250
1915 ...	...	10,569	19,373	41,916	3,689	50,349	523,652	13,586	663,134	...	...	...	...	132,456	795,590

NOTE.—Apparent discrepancies in this form are due to the elimination of fractions.

Form IX.

OUTTURN OF MINOR FOREST PRODUCE, 1923.

Description of produce.	Perak (North).		Perak (South).		Selangor.		Negri Sembilan.		Pahang (West).		Pahang (East).		Total.	
	Quantity.	Revenue.	Quantity.	Revenue.	Quantity.	Revenue.	Quantity.	Revenue.	Quantity.	Revenue.	Quantity.	Revenue.	Quantity.	Revenue.
		\$		\$		\$		\$		\$		\$		\$

RESERVED FORESTS.

Rotans ...	...	1,763	...	620	...	556	...	512	...	1,152	...	562	...	5,166
Bamboos ...	...	2	...	...	...	233	...	...	...	...	...	...	...	235
Wood-oil ... (gallons)	...	...	...	...	...	...	1,828	128	...	...	...	...	1,828	128
Damar ... (pikuls)	19.29	603	12.68 $\frac{1}{2}$	175	...	...	4,827.91 $\frac{1}{2}$	89,736 ^a	44.35	844	...	...	4,904.24	91,358
Torches ... (number)	...	...	...	...	...	...	16,260	41	...	...	...	...	16,260	41
Nipah ...	...	...	...	...	...	268	...	...	...	...	...	99	...	367
Gutta-percha ... (lbs.)	193	...	7	<i>b</i>	1,438	1,854	743	1,543	779	710	...	...	3,160	4,107
" ... (leaves)	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Rubber ... (cultivated)	...	35	...	...	...	40	...	10	...	...	...	...	...	35
" ... (wild) (lbs.)	...	...	...	...	...	...	...	...	...	...	...	...	...	50
Animal products...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Miscellaneous ...	...	747	...	20	...	5,521	...	1	...	...	...	...	...	6,289
Total	3,149	...	815	...	8,473	...	91,972	...	2,706	...	661	...	107,777

UNRESERVED FORESTS.

Rotans ...	...	2,297	...	5,901	...	1,992	...	2,054	...	4,149	...	6,396	...	22,789
Bamboos ...	...	182	...	1,305	...	1,125	...	35	...	369	...	285	...	3,300
Wood-oil ... (gallons)	...	...	...	...	...	...	5,588	269	100	65	9,379	522	15,067	855
Damar ... (pikuls)	31.68	63	28.68	40	2,920.41	1,473	6,251.26 $\frac{1}{2}$	2,456	992.51	7,213	891.29	900	11,115.83 $\frac{1}{2}$	12,145
Torches ... (number)	...	...	...	...	...	...	19,210	92	10,252	19	56,810	209	86,272	320
Nipah ...	...	12	...	1,038	...	31	...	227	...	...	...	2,150	...	3,459
Gutta-percha ... (lbs.)	34	...	1,139	104	...	...	58	176	3,166	534	13,735	3,309	18,133	4,124
" ... leaves (pkls.)	...	...	...	...	...	...	...	...	170.57	85	...	...	170.57	85
Rubber ... (cultivated)	...	...	29,877	372	...	...	...	...	261,316	1,925	4,993	...	296,187	2,297
" ... (wild) (lbs.)	...	...	...	...	...	...	...	...	...	...	...	293	...	293
Animal products...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Miscellaneous ...	...	968	...	2,101	...	474	...	636	...	470	...	1,948	...	6,598
Unreserved Forests Total	...	3,522	...	10,862	...	5,095	...	5,946	...	14,830	...	16,013	...	56,268
Reserved " "	...	3,149	...	815	...	8,473	...	91,972	...	2,706	...	661	...	107,777
Grand Total ...	...	6,672	...	11,677	...	13,568	...	97,917	...	17,537	...	16,674	...	164,045

a.—Includes \$87,532 from sale of damar worked by Departmental Agency in Reserved and Unreserved Forests.

b.—Excludes \$850 paid by Selborne Plantation Co., Ltd.

Note.—Apparent errors in this form are due to the elimination of fractions.

Form X.

STATEMENT OF REVENUE.

Revenue detailed.	Conservator.	Perak (North).	Perak (South).	Selangor.	N. Sembilan.	Pahang (West).	Pahang (East).	Total.		Difference.	
								Estimated.	Actual.	+	-
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
I.—FOREST PRODUCE REMOVED FROM THE FORESTS BY DEPARTMENTAL AGENCY—											
(a) Gutta-percha											
Estimated	11,000	4,000	...	30,000	...	45,000	...	...	...
Actual	104	1,854	1,720	1,175	...	...	4,854	...	40,146
(b) Damar											
Estimated	105,000	45,000	...	150,000	...	...	...
Actual	603	175	...	87,532	7,634	...	...	95,944	...	54,056
II.—FOREST PRODUCE REMOVED FROM THE FOREST BY CONSUMERS OR PURCHASERS—											
(a) Timber											
Estimated	...	50,000	89,000	36,000	40,000	25,000	25,000	265,000	...	...	...
Actual	88,351	148,563	56,557	62,236	52,632	40,800	...	449,139	184,139	...
(b) Firewood and charcoal											
Estimated	...	203,000	112,500	100,000	10,000	10,000	2,500	438,000	...	...	...
Actual	224,660	201,295	118,309	14,460	7,873	3,710	...	570,307	132,307	...
(c) Canes											
Estimated	...	2,200	11,400	1,500	2,500	3,000	2,400	23,000	...	...	...
Actual	4,059	6,521	2,548	2,566	5,302	6,958	...	27,954	4,954	...
(d) Rubber											
Estimated
Actual	35	372	40	10	1,925	...	...	2,382	2,382	...
(e) Gutta-percha											
Estimated	850	...	...	3,000	2,000	5,850	...	...	...
Actual	850	...	...	154	3,309	...	4,314	...	1,536
(f) Damar											
Estimated	200	500	2,000	100	2,800	...	...	...
Actual	63	40	1,473	4,659	424	900	...	7,559	4,759	...
(g) Other produce											
Estimated	...	1,000	3,000	2,200	1,300	500	3,000	11,000	...	...	...
Actual	1,911	4,466	7,652	1,430	923	5,507	...	21,888	10,880	...

Apparent errors in this form are due to the elimination of cents.

Form X—(cont.)

STATEMENT OF REVENUE—(cont.)

Revenue detailed.	Conservator.	Perak (North).	Perak (South).	Selangor.	N. Sembilan.	Pahang (West).	Pahang (East).	Total.		Difference.	
								Estimated.	Actual.	+	—
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
III.—DRIFT, WAIF, SEIZED AND CONFISCATED FOREST PRODUCE—											
Estimated ...	...	1,000	2,900	500	100	400	100	5,000	...	...	...
Actual ...	...	910	6,042	423	1,579	49	690	...	9,694	4,694	...
IV.—MISCELLANEOUS—											
(a) Compensation and fines Estimated	...	1,200	3,900	4,000	1,000	300	200	10,600	...	...	...
Actual ...	...	2,127	3,905	4,852	565	615	404	...	12,469	1,869	...
(b) Reimbursements											
Estimated ...	...	50	...	...	...	...	...	50	...	...	...
Actual ...	4	19	11	1	...	2	...	...	36	...	14
(c) Other sources											
Estimated ...	...	325	1,100	750	175	150	500	3,000	...	...	...
Actual ...	673	730	128	822	180	26	54	...	2,614	...	386
Total Estimated ...	...	258,775	235,650	149,150	160,575	119,350	35,800	959,300	...	...	...
„ Receipts ...	677	323,469	372,472	194,532	176,939	78,734	62,333	...	1,209,156	345,994	96,138
Difference { + ...	677	64,694	136,822	45,382	16,364	...	26,533	...	...	249,856	...
— ...	...	...	...	...	...	40,616	...	...	...	...	...

Apparent errors in this form are due to the elimination of cents.

STATEMENT OF EXPENDITURE.

	Conservator.	Perak (North).	Perak (South).	Selangor.	N. Sembilan.	Pahang (West).	Pahang (East).	Total.
	\$	\$	\$	\$	\$	\$	\$	\$
OTHER CHARGES, ANNUALLY RECURRENT.								
I. FOREST PRODUCE REMOVED FROM THE FORESTS BY DEPARTMENTAL AGENCY—								
(e) Gutta-percha ... ..	...	332	402	1,034	750	4,696	...	7,214
(f) Damar ... ..	...	6,489	299	...	33,568	4,195	...	44,550
II. FOREST PRODUCE REMOVED FROM THE FORESTS BY CONSUMERS OR PURCHASERS ... ..	...	120	255	174	...	...	...	550
III. DRIFT, WAIF, SEIZED AND CONFISCATED FOREST PRODUCE ... ..	...	24	...	...	...	1	10	36
IV. STORES—								
(a) Bicycles	78	595	541	538	849	363	250	3,214
(b) Boats and launches ... ..	...	3,308	247	786	270	399	89	5,100
(d) Tools and plant ... ..	...	7	18	6	...	70	40	141
(e) Survey, mathematical, and other instru- ments	2	10	...	46	...	...	...	58
(f) Books, maps, and other publications ...	1,433	175	121	297	191	100	72	2,390
(g) Furniture	6	48	49	58	16	45	45	267
(h) Uniforms	130	2,332	2,886	1,843	2,109	1,973	768	12,042
(i) Miscellaneous	402	180	12	215	102	68	37	1,016
V. COMMUNICATIONS AND BUILDINGS—								
(a) Roads and bridges ... ..	...	262	635	4,175	392	70	113	5,647
(b) Buildings ... ..	...	1,976	2,617	1,979	189	1,493	713	8,967
(c) Other works ... ..	...	231	322	241	495	136	56	1,481
VI. ORGANIZATION, IMPROVEMENT, AND EXTENSION OF FORESTS—								
(a) Demarcation ... ..	...	1,927	375	2,327	2,856	1,199	1,011	9,695
(b) Surveys ... ..	...	...	12	9	33	...	...	55
(c) Cultural operations ... ..	...	208	1,762	1,122	300	...	...	3,392
(f) Works of improvement ... ..	...	1,222	5,189	3,142	3,415	3,486	42	16,497
(g) Other works	1,522	208	44	36	...	...	...	1,810
VII. ALLOWANCES—								
(a) Personal ... ..	...	131	132	780	...	190	62	1,294
(b) Travelling	7,132	11,505	11,213	9,530	8,048	11,854	5,426	64,708
(c) Bicycles ... ..	...	1,000	720	800	1,440	1,400	...	5,360
VIII. MISCELLANEOUS—								
(a) Research and collection of specimens ...	2,400	121	243	585	264	277	99	3,987
(b) Rewards ... ..	...	...	...	50	20	...	130	200
(d) Other charges	753	698	594	729	1,158	268	332	4,531
Total Other Charges, Annually Recurrent ...	13,859	33,111	28,689	30,503	56,464	32,283	9,295	204,205

Form X—(cont.)

STATEMENT OF EXPENDITURE—(cont.)

	Conservator.	Perak (North).	Perak (South).	Selangor.	N. Sembilan.	Pahang (West).	Pahang (East).	Total.
SPECIAL EXPENDITURE.	\$	\$	\$	\$	\$	\$	\$	\$
IV. STORES—								
(a) Bicycles	147	751	270	210	240	676	158	2,453
(b) Boats and launches ... ..	...	56	...	660	...	40	70	826
(c) Survey, mathematical, and other instruments	31	49	...	...	1	...	12	93
(g) Furniture	848	37	...	...	...	54	...	940
(i) Miscellaneous ... ..	...	228	...	...	...	228	...	456
V. COMMUNICATIONS AND BUILDINGS—								
(b) Buildings ... ..	...	...	...	570	...	1,475	1,550	3,595
UNPROVIDED.								
(i) Bonuses to Messrs. Whitty and McCartney	550	...	...	...	...	...	...	550
(ii) Conservator's expenses at Forestry Conference in Canada	2,361	...	...	...	...	...	...	2,361
(iii) Agricultural Show	388	...	...	...	...	...	...	388
TOTAL SPECIAL EXPENDITURE ...	4,326	1,123	270	1,440	241	2,473	1,790	11,663
GRAND TOTAL ...	18,185	34,234	28,959	31,943	56,705	34,757	11,085	215,868

46

Apparent errors in this form are due to the elimination of cents.